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AUGUST, 1901

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# TEXTILE WORLD,

and
Industrial
Record.

## 1901 Edition

THE TEXTILE WORLD'S
OFFICIAL DIRECTORY
OF THE
TEXTILE INDUSTRIES
ALSO THE
YARN TRADE INDEX

*Office Edition, $2.50*
*Travelers' Edition, $2.00*

A leading firm writes:—
"We think the new features of the classified departments an exceedingly good idea and feel that it will be a great source of information in the various industries mentioned."

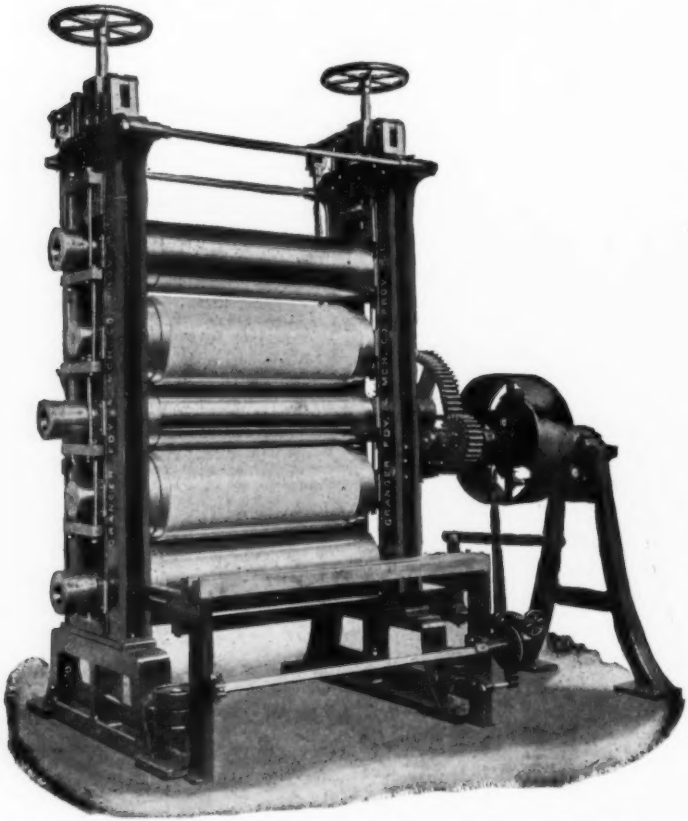
TABLE OF CONTENTS, - - - - Page 245
CLASSIFIED INDEX FOR BUYERS, - - Page 349

GUILD & LORD.
PUBLISHERS.

620 ATLANTIC AVENUE.
BOSTON, MASS.

# Bleaching, Dyeing, Drying,

## And Finishing Machinery.



## CALENDERS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

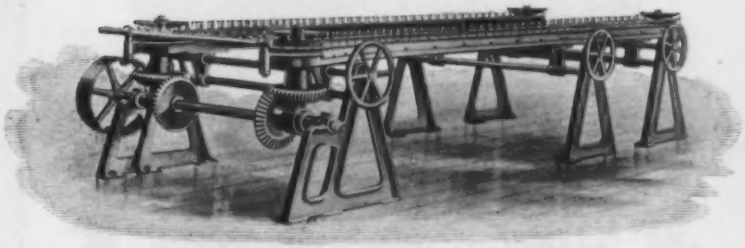
---

## Granger Foundry and Machine Co.

**PROVIDENCE, R. I.**

# Bleaching, Printing, Dyeing and Finishing Machinery

For Textile Fabrics.



STRAIGHT TENTERING MACHINE, WITH AUTOMATIC CLAMP. (Patented.)

## TENTERING MACHINES.

VIBRATORY (or Swiss) MOTION FOR LAWNS, ETC.

RETURN (8, 10 or 12) returns FOR WORSTED AND WOOLEN GOODS.

HOT AIR (2 or 4 returns) FOR GINGHAMS, ETC.

---

AUTOMATIC CLAMPS (Patented). SPRING CLAMPS. PIN CHAINS.

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# H. W. BUTTERWORTH & SONS CO.,

**PHILADELPHIA, PA.**

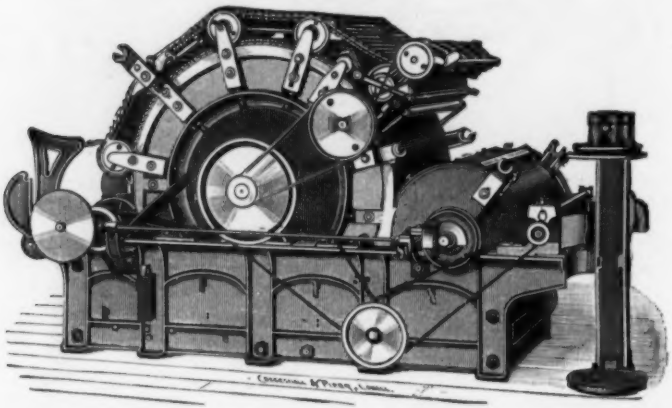
# LOWELL MACHINE SHOP,

LOWELL, MASS.,

**Builders of**

# COTTON MACHINERY

**OF EVERY DESCRIPTION.**



Revolving Flat Cards, Railway Heads,

Ring Spinning Frames, Fly Frames,

Drawing Frames, Spoolers, Warpers,

Slashers, Looms.

---

# Worsted Machinery.

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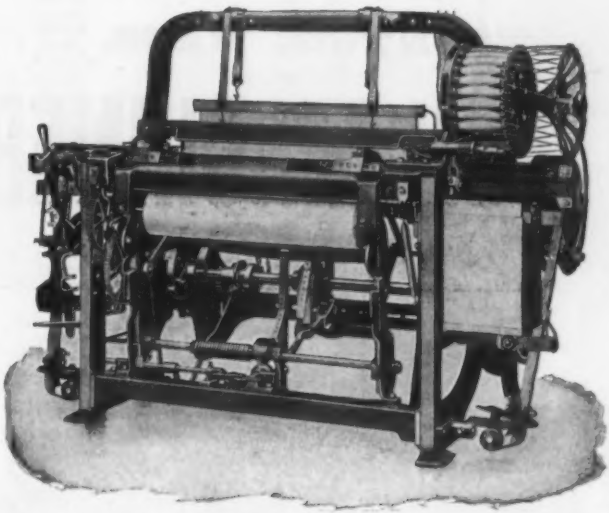
ILLUSTRATED CATALOGUES SENT ON APPLICATION.



OUR LATEST

NORTHROP LOOM

Although our order list lengthens and strengthens, we do not adopt the simple and inexpensive plan of building without change, but continually add improvements whenever possible. A careful study of the above illustration will prove of interest to adepts in the Art of Weaving.

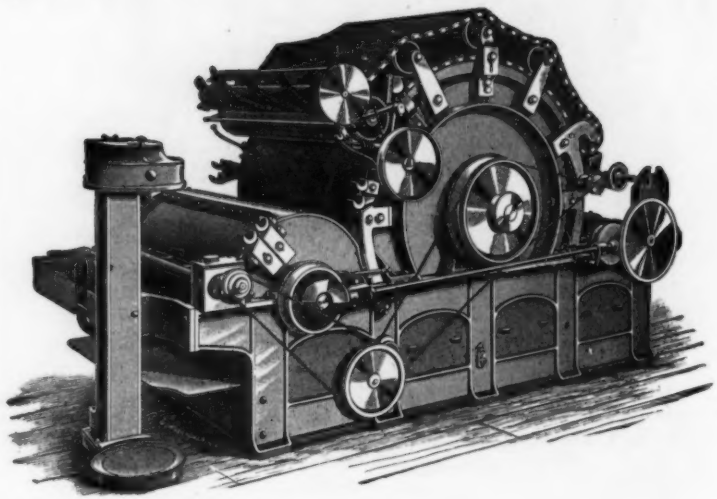
THE DRAPER COMPANY,

Hopedale, Mass.

# MASON MACHINE WORKS,

**TAUNTON, MASS.**

# COTTON MACHINERY



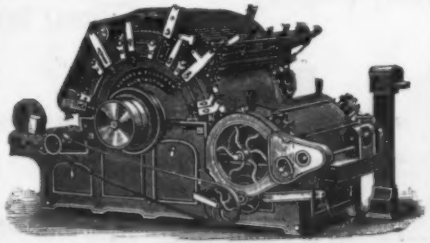
Cards, Combers, Lappers, Railway Heads, Drawing Frames, Spinning Frames, Mules and Looms,

INCLUDING THE

## Mason-Northrop Loom,

SOUTHERN AGENCY:

**D. A. TOMPKINS CO., Charlotte, N. C.**



HOWARD & BULLOUGH

# American Machine Company,

LIMITED,

PAWTUCKET, - R. I.

Boston Office, 281 Congress St.

## Revolving Flat Cards.

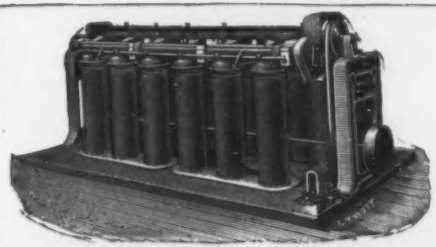
The Simplest and Most Accurate. Greatest Production. Best Quality. Least Waste.

OVER 16000 WORKING.

## Electric Stop-Motion Drawing.

The quality of the sliver produced cannot be surpassed. Waste, "single" and roller laps are prevented, production increased, and great saving effected.

OVER 56,000 IN OPERATION.



## Bale Breakers, Feeders,

## Combined Self-Feeding Openers,

## Breaker and Finisher Lappers,

All made from entirely new patterns and containing many valuable patented improvements.

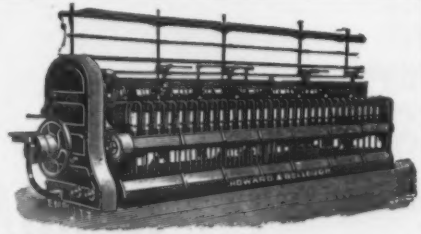
## Slubbing, Intermediate, and Roving Machines.

New patented Differential motion, New Arrangement of Cone Drums, New System of Balancing top or bobbin rail, etc.

SPINNING FRAMES, CONE WINDERS,
TWISTERS, WARPERS AND SLASHERS.

**All parts of above machines are made by special tools and are exact duplicates.**

We invite investigation and Comparison.



# THE WHITIN MACHINE WORKS,

Whitinsville, Mass.

Revolving Flat Carding Engines.

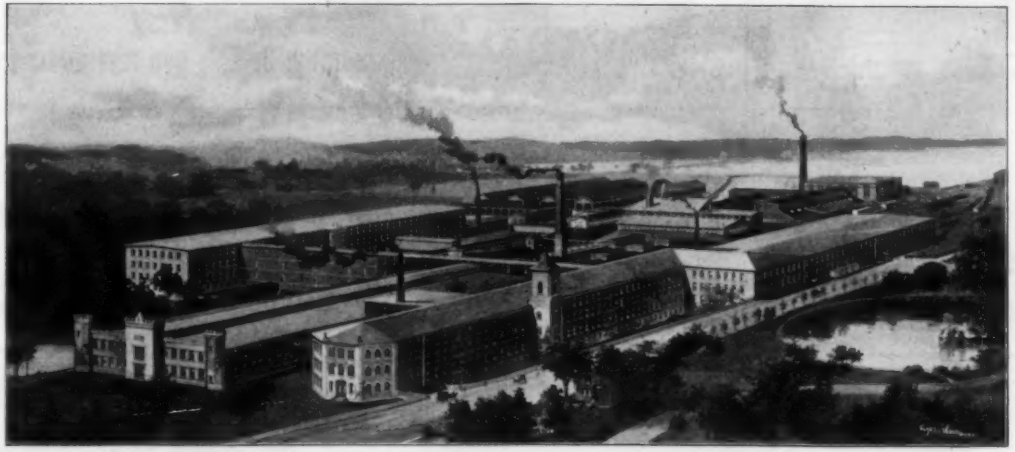
Sliver Lap Machines.

Ribbon Lap Machines.

Combers.

Railway Heads.

Drawing Frames.



Spinning Frames

Spoolers.

Twisters.

Reels

Long Chain Quilling Machines.

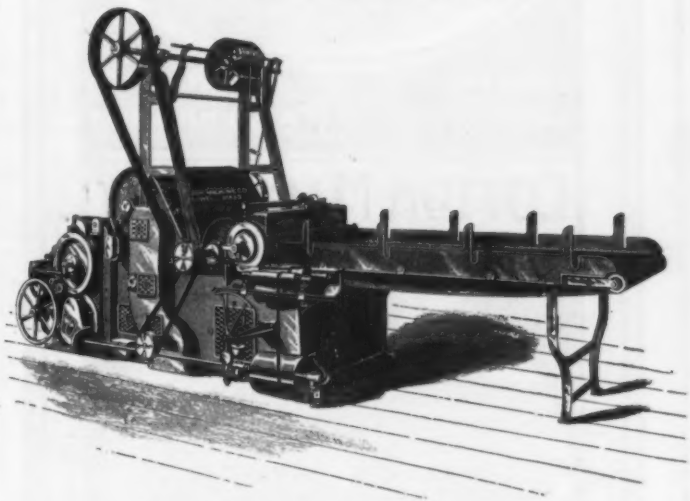
Looms.

# COTTON MACHINERY

Southern Agent, S. W. CRAMER, 38 So. Tryon St., Charlotte, N. C.

# The Best Pickers.

In the Cotton Field nothing equals the
DARKY COTTON PICKER.



In the Cotton Mill nothing equals the
KITSON COTTON PICKERS.

## KITSON MACHINE CO., Lowell, Mass.

**Largest Builders of Cotton Openers and Lappers in the World.**

**STUART W. CRAMER,** Southern Agt., Charlotte, N. C. and Equitable Building, Atlanta, Ga.

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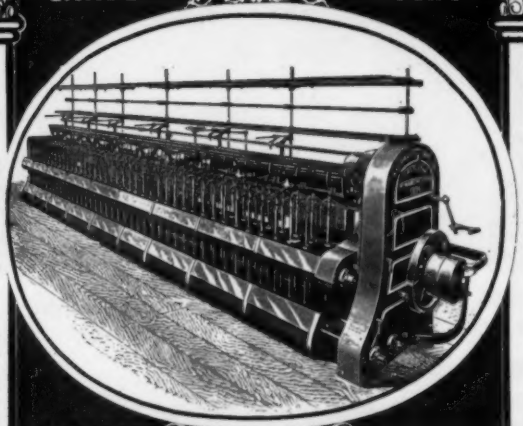
DRAWING FRAMES · SPEED FRAMES
· CARDS · · MULES ·



COMBERS · · FLYERS ·
CARD CLOTHING · WASTE MACHINERY

## COTTON MACHINERY

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Card Room Machinery.
**TAYLOR LANG & CO. LTD.**
Self Acting Mules.
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Flyers.
**C. CAIN, SON, & GREENWOOD,**
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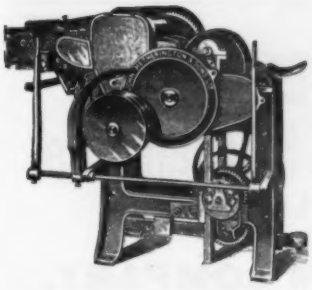
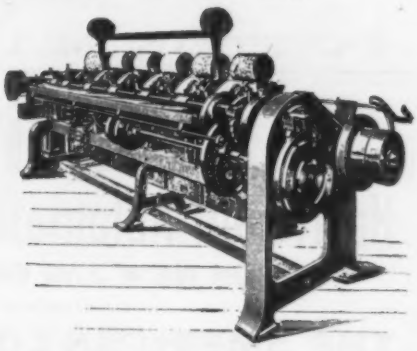
# JOHN HETHERINGTON & SONS, LD.

**Manchester: England,**

——MAKERS OF ALL KINDS OF——

## Machinery for Preparing, Spinning, Doubling Cottons, Cotton Waste, Woolen, Etc.





### Sliver Lap Machines

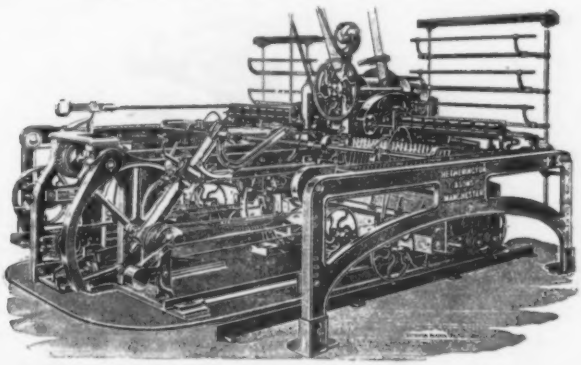
with Self Acting Stop Motion.

### Ribbon Lap Machines

with six Laps behind for preparing Laps for Combing Machines, made to suit any width of Laps required.

### Combing Machines,

single and double Nip for six or eight heads, to take Laps from 7 1-2 in. to 10 1-2 in. wide. Patent Stop Motions for stopping Machine, when delivering too light Slivers, or after any required length has been delivered.



### Patent Self Acting Mules

(Hetherington and Curtis Patterns of Headstock) for coarse, medium and fine yarns.

**Over Three Million Spindles at Work in the U. S.**

**SOLE IMPORTER FOR UNITED STATES AND CANADA.**

**STEPHEN C. LOWE,** 41-42 BREWER BUILDING, 186 DEVONSHIRE ST. **Boston, Mass.**

J. S. COTHRAN, Southern Agent, Offices 4-C's Bldg., Charlotte, N. C.

**"Nothing is either great or small except by comparison."**

This accounts for the GREATNESS of the Picking Machinery built by

THE A. T. ATHERTON MACHINE CO., Pawtucket, R. I.

MANUFACTURERS OF

COTTON MACHINERY.

# NOTICE.

## Harriman Automatic Mechanisms

**On NEW and OLD LOOMS.**

Attached by

**THE AMERICAN LOOM COMPANY,**

READVILLE, MASS.

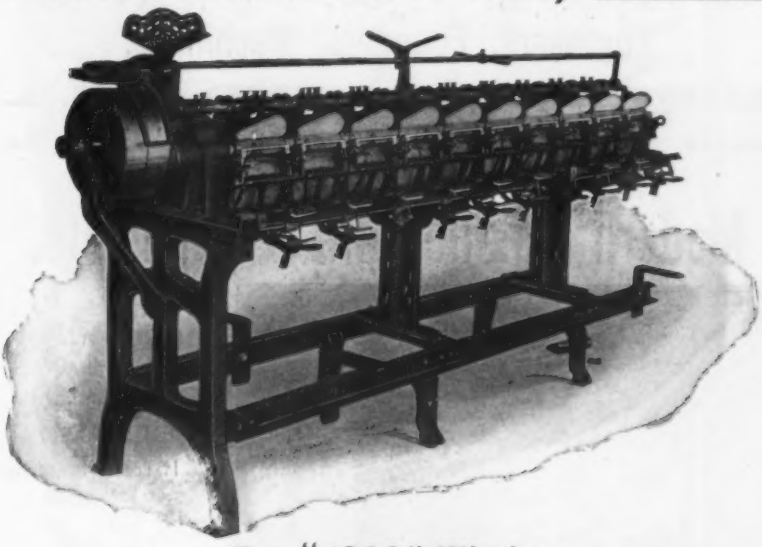
# YOUR SPOOLING!

Improve the Quality.
Decrease the Cost.

The Barber Knotter will do it. Can you afford to be without it?

**BARBER & COLMAN,** Room 1119, **11 Pemberton Sq.**
**BOSTON, MASS.**

# Foster Machine Co., WESTFIELD, MASS.



**The "1900" Winder**

Patented in United States and Europe. Fastest running Winder in the market. Greatest production, best shaped cones. **NO OIL OR DIRT CAN GET ON THE YARN.** Has independent drive for rolls. Even tension and speed. Less power to run. Stop Motion acts when a thread breaks or runs out.

# Ross's New Patent Automatic Loom.

**No. 631407 — 1899.**

The inventor is desirous of making arrangements with a first-class loom building or machinery concern, to buy outright or in part, his American Patent Rights. The Loom is now thoroughly tested, and is claimed to be more simple and easily mastered by loom-fixer and weaver than any automatic loom yet designed, and much cheaper to build. One weaver can attend three or four times present number of looms, and increase production for loom. Correspond with

**HUGH R. ROSS,**

**DURHAM STREET MILLS, BELFAST, IRE.**

# THE DODGE MFG. CO.

## Engineers, Founders, Machinists,

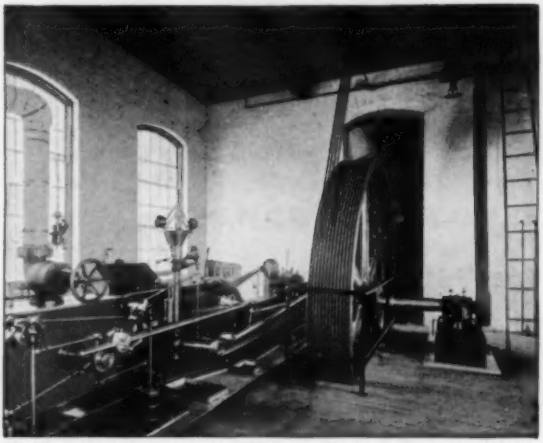
## MISHAWAKA, IND., U.S.A.

**Branches:**

**BOSTON. NEW YORK. CHICAGO. CINCINNATI, ATLANTA, GA. LONDON, ENG.**

DESIGNERS AND BUILDERS OF

# Modern Textile Mill Equipments.



325 H. P. Rope Drive, Gwinnett Cotton Mills, Lawrenceville, Ga.

Embracing
LATEST IMPROVED
DEVICES

Embodying
HIGHEST EFFICIENCY
In Power Transmission
Engineering.

The "DODGE"
AMERICAN
SYSTEM ROPE
TRANSMISSION.

**CAPILLARY SELF-OILING BEARINGS**—Oil Economizers.

**IRON CENTER WOOD RIM TEXTILE PULLEYS**—Designed especially for Textile Mill Work.

**COUPLINGS**—in variety.

**SAFETY IRON CENTER WOOD RIM FLY WHEELS. IRON SPLIT AND SOLID PULLEYS, SHAFTING, ETC.**

We have a large engineering force and will be pleased to assist you in the determining of your requirements in our line upon receipt of letter stating just what you desire to accomplish. Address nearest office.

Every Mill Man
Should Keep Posted by Reading
*Power and Transmission*

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MODERN POWER TRANSMISSION ENGINEERING
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BRANCHES ~ BOSTON NEW YORK CHICAGO CINCINNATI ATLANTA LONDON, ENG.

# "CYCLONE" DRYERS

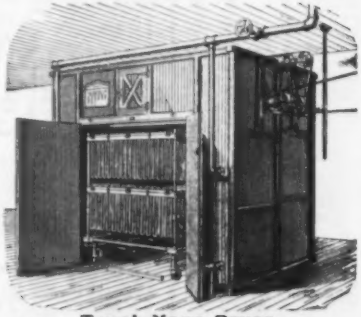
Automatic Yarn Dryer.

**For Hosiery, Underwear, Yarn, Cotton Stock, Wool, etc.**

CARBONIZING MACHINES,

YARN SCOURING MACHINES,

BREASTS, BURRING MACHINES



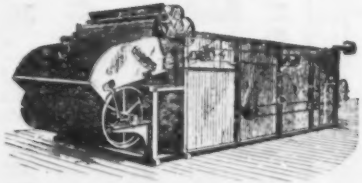
Truck Yarn Dryer.

FEED ROLLS, LICKERS-IN.

Phila. Textile Machinery Co,

Hancock and Somerset Sts.,

PHILADELPHIA, - PENN



Automatic Cotton Stock Dryer.

# GARNETT MACHINES

# "HURRICANE" DRYERS

—FOR—

WOOL, COTTON, HAIR YARN, STOCKINGS, UNDERWEAR, &c.

Automatic Stock Dryer for Cotton and Wool.

PHILA. DRYING MACHINERY CO.,

## CARBONIZERS,

Yarn Scouring Machines.

## "HURRICANE" FANS

for Ventilating and Drying.

Best in Construction. Lowest in Price

Plans, Estimates and Catalogues sent upon application.

6721 GERMANTOWN AVE. PHILADELPHIA, PA

## Saco and Pettee Machine Shops,

NEWTON UPPER FALLS, MASS., U. S. A.

# COTTON MACHINERY

PICKERS, SLUBBING, REVOLVING FLAT CARDS, INTERMEDIATE AND ROVING FRAMES, RAILWAY HEADS, DRAWING FRAMES, SPINNING FRAMES, SPOOLERS.

SHOPS: Biddeford, Me. Newton Upper Falls, Mass.

Southern Agent: A. H. WASHBURN, Charlotte, N. C.

# FAIRMOUNT MACHINE CO.

22ND & WOOD STS. PHILADELPHIA.

THE LATEST AND BEST

LOOMS, DOBBIES, HARNESS MOTIONS

BEAMING, SPOOLING, WINDING, DYEING, AND SIZING MACHINERY.

POWER TRANSMITTING MACHINERY.

FREIGHT ELEVATORS. PATENT FRICTION CLUTCHES.

## "ALL SHEAVES LOOK ALIKE TO ME."

# DO THEY?

JUST ASK US ABOUT OUR

## Machine-Moulded Sheaves.

LINK-BELT MACHINERY CO., - Chicago.

# Fabric Measuring and Packaging Co.

**Postal Telegraph Building, Broadway and Murray Street, New York, U.S.A.**

*Midnight Fast Black*

*„Amisilk"*

*Pickaninny Fast Black*

**Accurate Measurement. Print Measurement and Trade Mark Automatically Every Yard.**

## OUR MACHINES PRINT TRADE MARKS

**ON COTTONS, WOOLENS, CARPETS (Single and Double Widths.)**

We lease and license our machines to measure and imprint the measurement upon fabrics, fold the same lengthwise and roll into merchantable packages all in one operation.

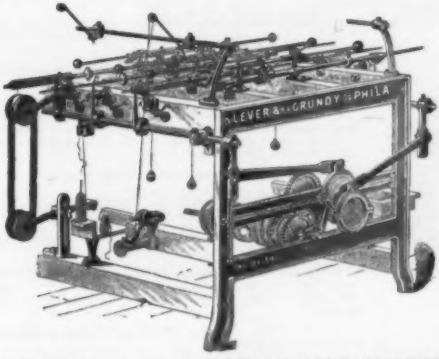
**PAID UP LEASES ISSUED.**

# OSWALD LEVER,

**Formerly LEVER & CRUNDY**

BUILDERS OF

# TEXTILE MACHINERY.




**FILLING COP WINDING MACHINES.** Spindles driven by belts or by gears. To wind cops. Cops to weave from the inside, or butts to weave from the outside. Can be made to wind any kind of filling from the coarsest to fine numbers. These machines will put the most yarn in as given size of shuttle than any other machine in use.

**BANDLESS SPINDLE SPOOLING MACHINES.** Adapted to the finer grades of yarn and to the finest silk.

**PRESSER DRUM SPOOLING MACHINES.** Arranged to spool in any way the trade requires.

**BANDLESS VARIABLE SPEED MACHINES.** To wind the large bobbins used in knitting mills.

## CONICAL and STRAIGHT TUBE WINDING MACHINES.

## DRESSER SPOOLING MACHINES.

Beaming Machines, Sectional Warp Mills, Chenille Cutting Machines, Reeling Machines to prevent waste at the bottom of mule bobbins.

**Lehigh Ave. & Mascher St., PHILADELPHIA, Pa.**

# Old Colony

TRADE MARK

GEO·B·CARPENTER & CO.

CHICAGO.

NONE SO GOOD FOR THE PRICE.

NONE BETTER AT ANY PRICE.

EST'D. 1840

ALL SIZES FROM 1/4 TO 2" IN DIAMETER IN LENGTHS UP TO 3000 FT. IN STOCK.

## TRANSMISSION ROPE

## A PERFECT PIN TICKET

**For Cloth Samples and Garments.**

Easily and quickly applied to fabrics of any weight.
Securely attached and yet easily detached if necessary to remove.
The machine does the whole thing.
It is cheap, serviceable and durable.

We also make a machine which

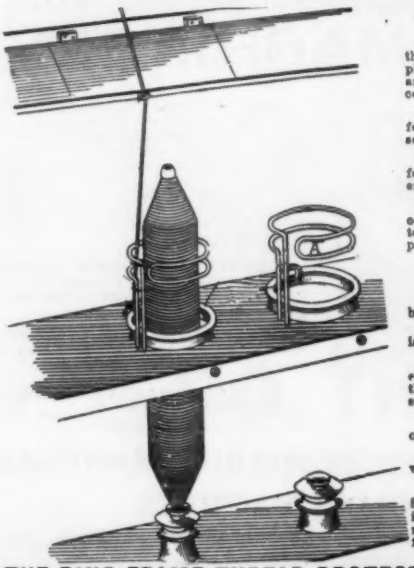
**PRINTS the TICKETS as they are attached if desired.**

Send for particulars to

SARANAC ELECTRICAL MFG CO.,

**ST. JOSEPH. MICH**

# New Thread Protector for Ring Spinning



The following advantages are claimed for this protector.

1. The speed of the frame will be increased, and also the production on frames without any protectors or plate separators about twenty five to thirty per centum, and on frames with separators about twelve or fifteen per centum.

2. The threshing and consequent imperfection and inferiority of yarn and cloth, occasioned by the use of blade separators is entirely obviated.

3. The traverse of the rail can be increased from one-fourth of an inch to one inch, if frame permits, thereby enabling the use of longer bobbins.

4. The life of the traveller is prolonged fully fifty per cent on account of a more even tension being imparted to the traveller, the same being held in a perpendicular position at all points of the traverse,

5. Frame and rail more perfectly balanced.

6. Heavier travelers can be used.

7. The yarn is wound tighter and more uniformly on bobbins.

8. A material saving in time of doffing, as more yarn is wound on, and longer bobbins can be used.

9. Saving of time of the operator on account of fewer ends breaking, thereby increasing the quality of yarn, and the operator can attend many more spindles in consequence.

10. The life of the ring will be prolonged on account of decreased friction.

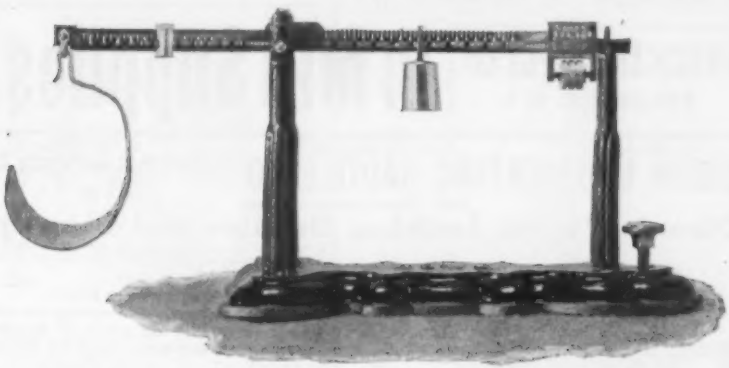
11. No accumulation of lint, dust and dirt, which invariably results in the use of blade separators.

The above results have been obtained in the mills of S Sanford & Sons. Carpet Manufacturers, Amsterdam, N.Y. in whose mills the protectors have been in use on all spinning frames since October 1899, and by permission we refer to said firm for a confirmation of our claims.

THE RING FRAME THREAD PROTECTOR CO., - Amsterdam, N. Y.

# A ROVING or YARN SCALE

That will weigh by HALF GRAINS up to 1,000 GRAINS (over 2 1-4 oz.)



**With the Weights All On The Beam.** **No Lost Weights With This Scale.**

One of the Most Sensitive Scales Made. Positive and Accurate. Send for prices.

**SWEET & DOYLE, - Cohoes, N. Y.**

KNITTING MILL SUPPLIES.

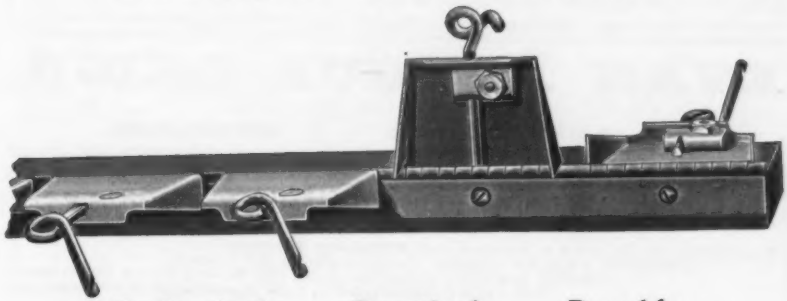
☞We make Scales of Every Description.

HOUGHTON'S

# ALL STEEL THREAD BOARD

WITH

## Hardened Thread Guides.



**Mechanical. Practical. Durable.**

A sample sent on receipt of 15 cents.

**L. T. HOUGHTON,** Sole Manufacturer, **Worcester, Mass.**

PATENTS PENDING.

# ANYTHING

Entire Outfits for New Mills, or small and odd items that you don't know just where to obtain, can be found at the

**AMERICAN SUPPLY CO.**
PROVIDENCE, R. I.

# in Mill Supplies.

E. Dixon. Established 1876. F. M. Dixon.

## DIXON LUBRICATING SADDLE CO., BRISTOL, R. I.

Sole Manufacturers of

**Dixon's Patent Locking Saddles and Stirrups**

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

**The Stirrup is always in place.**

**No bent stirrup resting on rolls.**

Manufacturers of all kinds of **Saddles, Stirrups and Levers.** Send for Samples and Prices.

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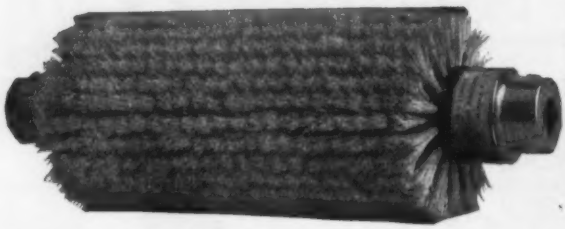

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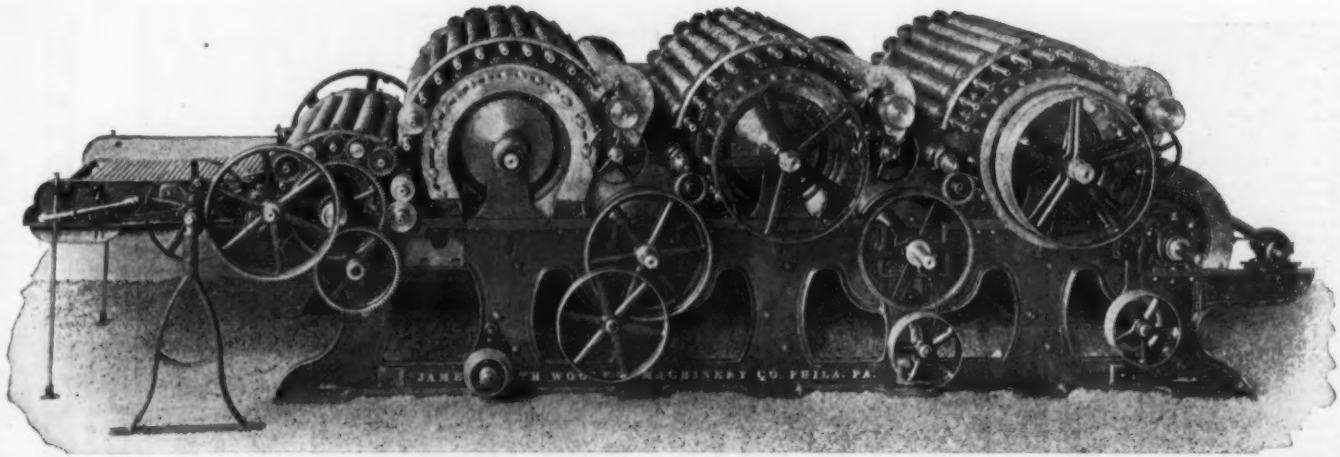

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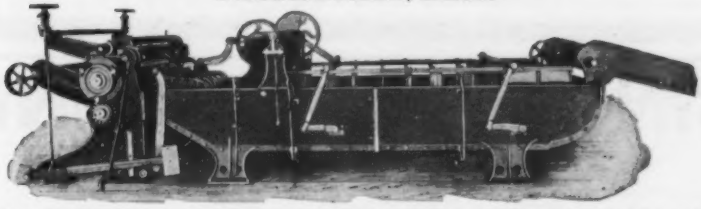

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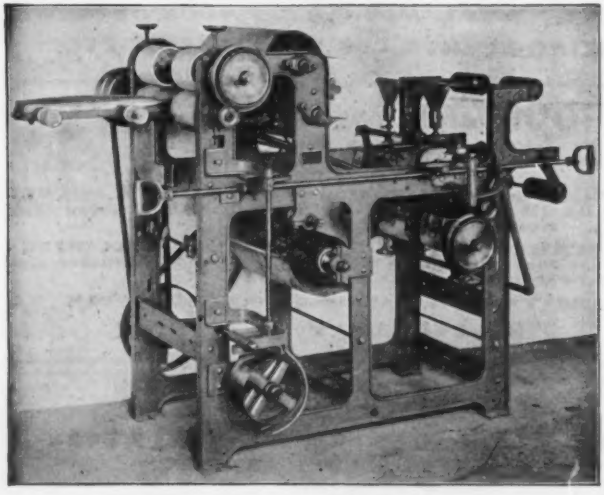

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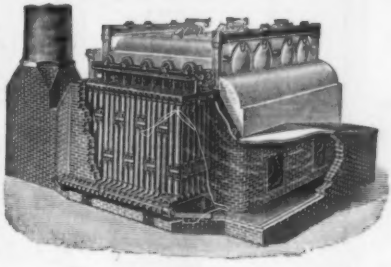

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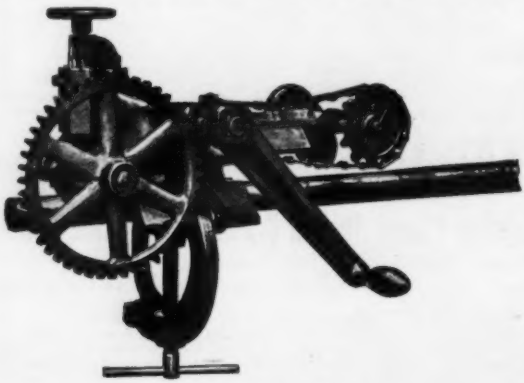

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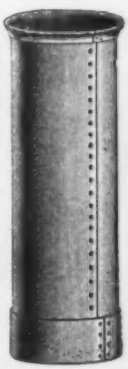

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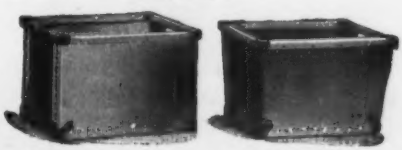

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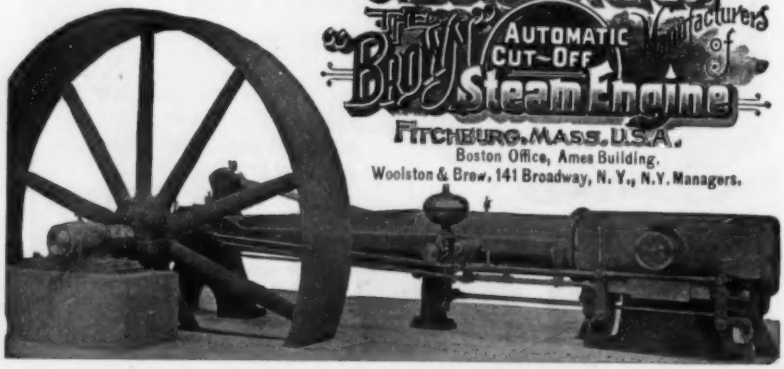

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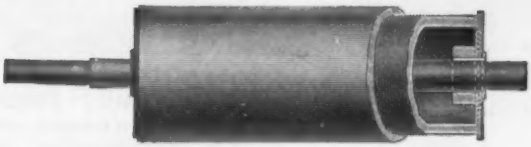

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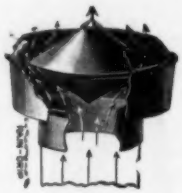

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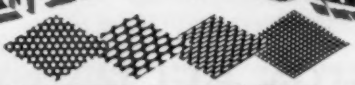

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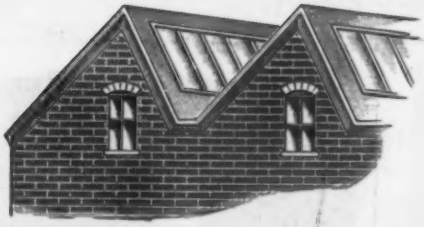

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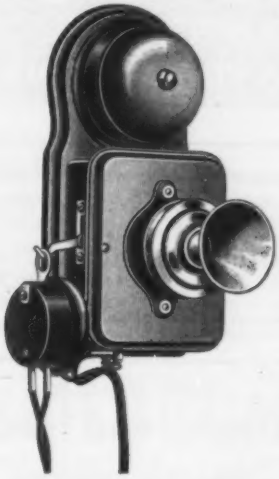

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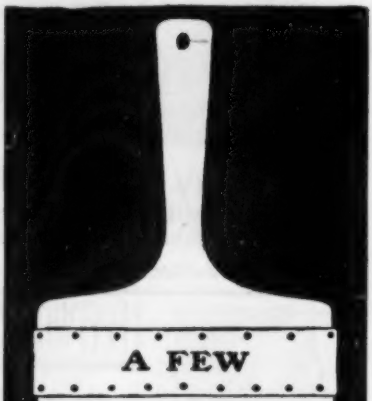
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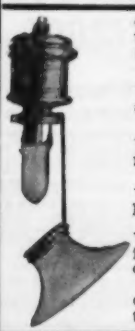
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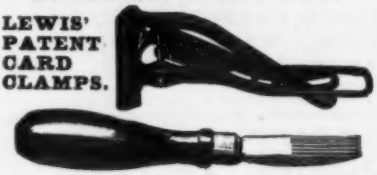

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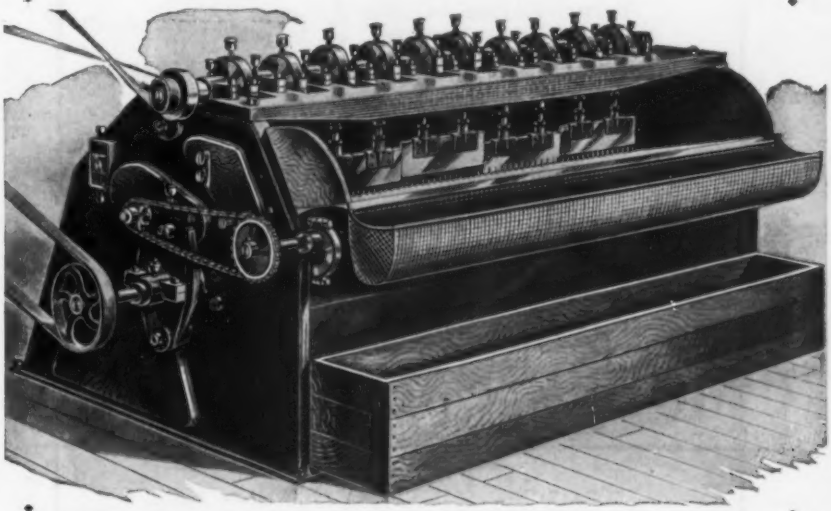

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## CONTENTS.


| | PAGE |
|---|---|
| Portrait and Biographical Sketch of D. A. Tomkins | 250 |
| Product and Profit | 252 |
| Asiatic Labor in Cotton Mills | 253 |
| Duty on Artificial Silk Yarn | 253 |
| Education and Wealth | 254 |
| Selling of Print Cloths | 254 |
| Knit Goods Situation | 259 |
| The Cross Bred | 261 |
| The Ross Self Changing Shuttle Loom | 264 |
| Cost Finding | 266 |
| Hard Fibre Baskets, Truck and Roving Cans | 272 |
| The Action of Caustic Soda on Wool | 273 |
| The Houghton Metal Thread Board and Guide | 278 |
| Memoirs of a Veteran Wool Carder | 279 |
| **Cotton Department** — American Cotton Spinning Machinery—Thick Places in Cotton Yarn—Temperature and Humidity in Mills—Separator for Spinning Frames | 281 |
| **Woolen Department** — Finishing Wool and Mixed Fabrics—An Improved Mule Carriage and Rail—Machine for Removing Burrs from Wool—Device for Preventing Mill and Washer Wrinkles—A Woven Fabric | 289 |
| **Knitting Department** — The Production of Circular Spring Needle Knitting Machines—Scouring Hosiery—A New Automatic Folding and Cutting Machine—Some Causes of Imperfect Knit Goods—German Knitting Needles—A Knitting Machine Needle—An Automatic Locking Device for Knitting Machine Yarn Guides—A Knit Fabric—Cuban Imports of Textiles | 296 |
| **Silk Department** — Notes on Knots—Silk Finish—Warping Taffetas—Marking the Width of Ribbons | 305 |
| **Power Department** — Power Transmission—The Pliability of the American System Rope Transmission—Cling-Surface at the Buffalo Exposition | 309 |
| **Dyeing Department** — Recipes—The Dyeing and Finishing of Aniline Black Hosiery—The Showerproofing of Textile Fabrics—Chlorinating of Wool—Peroxide Bleaching and the Stoving of Woolens | 315 |
| Questions and Answers | 325 |
| New Publications | 326 |
| Industrial News | 328 |
| Mill News | 332 |
| Personals | 343 |
| Patents | 24 |

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## List of Textile Patents.

**Issued July 2, 9, 16 and 23.**

Bale for Fibrous Material. 678,134. Charles E. Parker, Orange, N. J.

Chenille-machine. 678,727. Frederick H. Geldermann, Paterson, N. J.

Cloth-folding Apparatus. 678,799. Elmer E. Terbush and Elmer R. Willcox, Peekskill, N. Y.

Cloth Cutting and Folding Machine. 678,099; 678,100. Calvin N. Colpitts, Boston, Mass., assignor to American Shade Machine Company, same place and Portland, Me.

Cloth-cutting machine, Electric. 678,263. Robert E. Leve, New York, N. Y.

Cloth-drying Machine. 678,136. Charles W. Russell, Providence, R. I.

Cloth-guiding Device, Automatic. 678,121. Willard T. Lewis, Walpole, Mass.

Cloth-cutting Machine. 679,056. George E. Lewis, Brooklyn, N. Y., assignor to Holzman Bros., New York, N. Y.

Cloth Folding and Holding Device. 678,945. Nelsine P. Denckla, Denver, Colo.

Fabric, Machine for Cutting Rolls of Woven. 678,371. Horace G. Bender, Akron, Ohio.

Fabrics, Decorating Plaited. 678,164. Victor Crepet and Casimir J. Dumoulin, Lyons, France.

Fibre-separating Machine. 677,914. Samuel B. Allison, New Orleans, La.; C. A. Dorrestein administrator of said Samuel B. Allison, deceased.

Knitting-machine Needle. 677,806. Robert W. Scott, Philadelphia, Pa., assignor of one-half to Louis N. D. Williams, Ashbourne, Pa.

Knitting Machine. 679,281. Edward E. Kilbourn, New Brunswick, N. J.

Loom weft-replenishing mechanism. 678,781. Henry I. Harriman, New York, N. Y.

Loom, Hand. 679,132. Martha P. Todd and Dana Todd, Minneapolis, Minn.

Loom Thread-parter. Weft-replenishing. 679,034. Julius Peter, Rutl, Switzerland, assignor to the Maschinen-fabrik Rutl, vormals Caspar Honegger, same place.

Loom. 678,294. Wm. F. Draper and Charles F. Roper, Hopedale, Mass., assignors to Draper Company, same place and Portland, Me.

Loom. 678,106. Jacques Hohl, West Hoboken, N. J.

Loom. 678,279. George R. Race, Philadelphia, Pa., assignor of one-half to John P. Wood, same place.

Loom Picker Mechanism. 678,241. Thomas Gilson, Providence, R. I.

Loom Shuttle-checking Means. 678,321. Charles F. Roper, Hopedale, Mass., assignor to Draper Company, same place and Portland, Me.

Loom Filling-replenishing Mechanism. 677,838. Horace W. Wyman, Worcester, Mass.

Loom Pick-finder. 677,513. Kirkley Hyde, Lowell, Mass., assignor to the Draper Company, Hopedale, Mass. and Portland, Me.

Loom, Weft-replenishing. 677,607; 677,608. Edward S. Stimpson, Hopedale, Mass., assignor to Draper Company, same place.

Measuring and Winding Machine, Cloth. 679,101. Burdis Anderson, Boardman, N. C.

Mercerizing. 677,450. Fernand Gros and Paul Bourcart, Remiremont, France.

Spinning Machine, Ring. 678,408; 678,409. Wilhelm Lengweiler, Wangen, Algau, Germany.

Spinning Machine. 677,791. Oscar L. Owen, Whitinsville, Mass., assignor to the Whitin Machine Works, Incorporated, same place.

Spinning or Twisting Machine Thread-guide Support. 677,988. Lewis T. Houghton, Worcester, Mass.

Spinning-ring. 678,266. Frank M. Marcy, Worcester, Mass.

Spinning-spindle Plumbing Device. 677,994. Harold Kelly, Biddeford, Me., assignor of one-half to Edward M. Lang, Jr., Portland, Me.

Spool or Bobbin. 678,540. Henry E. Chase, Cambridge, Mass.

Top Roll. 678,538. Leon W. Campbell, Woonsocket, R. I., assignor of one-half to Malcolm Campbell, Boston, Mass.

Tufted Fabric. 678,347. Albert F. Mrock, Chicago, Ill.

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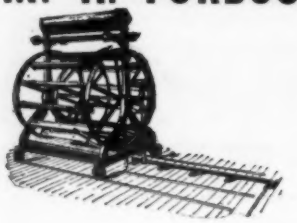

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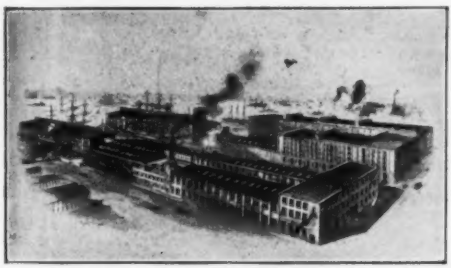

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# TEXTILE WORLD.

Vol. XXI. AUGUST, 1901. No. 2.

## D. A. TOMPKINS.

D. A. Tompkins was born on "Meeting Street Plantation," Edgefield, S. C., October 12, 1852. He attended the academic schools in the neighborhood, and at seventeen years of age went to the S. C. College, Columbia, S. C., where he remained for two years. He completed his education at the Rensaler Polytechnic Institute, Troy, N. Y., which he attended from 1869 to 1873. After leaving this institution he secured his first position with A. L. Holley, engineer of the Bessemer Steel Works, by whom he was employed as private secretary and draftsman for one year. Mr. Holley attained a high position in his profession, and the engineers of Europe and America erected a pedestal in Washington Park, N. Y., on which was placed the bust of this able engineer.

Young Tompkins was next employed by John Fritz, the builder of the Bethlehem Iron Works, where the armor plate and ordnance forgings for the United States navy and land defences are now made. He remained with Mr. Fritz and this company for ten years serving in the capacity of machinist, draftsman, head draftsman, assistant to the master machinist. Most of the machinery now being used for making armor plate and ordnance forgings was designed and built by Mr. Tompkins as head draftsman under the direction of his chief, John Fritz, the great American engineer in steel and iron.

From Bethlehem Mr. Tompkins went to Crystal City, Mo., to accept the position as master machinist in the Crystal Plate Glass Works under the direction of E. A. Hitchcock, who was then president of this company, and is now Secretary of the Interior at Washington. One year later he entered the services of the Westinghouse Co., and later went to Charlotte, N. C., to engage in the cotton oil business as engineer and contractor. His experience, ability, and great energy brought success in this new field, and he has built more than seventy-five cotton seed oil mills in different parts of the country. He also engaged in the production of sulphuric acid and fertilizers, building several works for the manufacture of these products. Later he became interested in cotton manufacturing, and here again was very successful, having built more than fifty cotton mills in the Southern States.

Mr. Tompkins is not only a patient and indefatigable worker, but is also a student and thinker. He is the author of the following works which have attained a large circulation, and have been adopted as text books in most of the textile schools in the South: Cotton Mill Commercial Features; Cotton Mill Processes and Calculation; Cotton Value in Textile Fabrics; American Commerce: Its Expansion; Cotton and Cotton Oil. Mr. Tompkins is a ready and forcible speaker, and while firm in the maintenance of his own convictions, possesses the admirable quality of conceding to others the same right to their opinions.

He is now in the prime of life, an active man of affairs, a representative Southern business man who holds broad views on commercial and political questions, and one who is likely to be heard from in the future in both business and political fields.

## *PRODUCT AND PROFIT.*

Of the two factors, selling price and cost, which determine the profit or loss of textile manufacturing, the general public is necessarily far better acquainted with the selling price of the manufactured goods than with the cost of producing them.

To a considerable extent the information as to selling prices of goods is public property, published far and wide; but the figures relating to the actual cost of production are buried among the office records of the mill and jealously guarded from public view.

—It is for this reason that undue importance is given by the press and public to the advances or reductions made in the prices of manufactured goods. An advance in price may mean a decreased profit or even a loss, if accompanied by an increase in the cost of the goods; while a reduction in selling prices may mean an increased profit, if accompained by a decrease in the cost of production.

It is not the level of selling prices, but the difference between that level and the level of cost of production that determines whether there is a profit or a loss.

—The mill cost of producing textiles, aside from the cost of the raw material, depends in large measure upon the size of the product. Few persons not acquainted with mill operations realize the extent to which the cost of goods is increased when the size of the product decreases. There are many textile manufacturers who fail to fully realize this increase. It can be appreciated only when the observer is face to face with the facts.

We are able to present to our readers an illustration, taken from a textile mill just preceding, during and right after the dark days of 1896, when business was paralyzed by the attack on the currency and national credit. The figures given are no fancy sketches but are taken from the actual records of the mill in question. The following table will show at a glance the number of yards produced, the total amount of the pay roll and the cost per yard for three different periods; the first being previous to the slackening in the operations of the mill; the second being at the depth of the business depression; and the third soon after the election of 1896 had removed the danger, and when business was slowly reviving:

| 4 weeks ending | Yards Manufactured. | Pay Roll. | Cost of Labor per yard of 50 picks. |
|---|---|---|---|
| Nov. 9, 1895, | 70,796 | 18,831.74 | .266 |
| May 23, 1896, | 16,324 | 8,896.58 | .545 |
| Apr. 24, 1897. | 58,713 | 17,321.33 | .295 |

The yardage for each period has been reduced to its equivalent in a standard fabric in order to make the comparison fair.

These figures include only the labor and salaries. The cost per yard for many other items, such as supplies of various kinds, interest, fuel, etc. etc., were correspondingly increased when the production fell off.

Here we see the cost of labor per yard more than doubled by a decrease in the number of yards produced. This increase of 28 cents per yard in labor alone would be equal to 22 4/10 per cent. on the market price of goods selling for 1.25 per yard.

—Let us assume that the asking price of this mill's goods was 1.25, netting the mill 1.05 after deducting 16 per cent. for selling expenses, and the cost per yard at the decreased production to be as follows: Raw material, .50; labor, .545; expense .135; total 1.18. This would mean a loss of 13 cents per yard.

Now assume that a reduction of 10 per cent. in the selling price would have enabled the mill to sell the full production. We would then have the following result; selling price, 1.12½, less selling expenses, 16 per cent. would net the mill .94½. Cost: Raw material, .50; labor, .265; expense, .135 total .90; showing a profit of 4½ cents per yard. In other words a loss of 13 cents per yard would be converted in-

to a profit of 4½ cents by reducing the price 10 per cent., by reason of the reduced cost of labor alone on a full production.

—While this is an extreme case, it serves well to illustrate the effect of production upon the cost of goods. It is commended to the attention of manufacturers who strive for an advance of five or ten per cent. in the price of their goods, while their spindles and looms are rusting from idleness. No mill in ordinary times can make a profit when producing one-half or two thirds the quantity of goods of which it is capable, and for which it is organized.

## *ASIATIC LABOR IN COTTON MILLS.*

In the July issue we called attention to the rapidity with which cotton yarn manufactured by the low priced labor of Japan and India had driven English yarn from the Chinese market.

Much light is shed upon the relations existing between the Indian cotton operative and his employers by the account of a strike last June in the Bombay cotton mills. From it we learn of the low level to which the Asiatic laborer has sunk, but that there is, nevertheless, a limit to the oppression to which he will submit.

The wages of Bombay mill operatives is kept back for two or three months. In the early part of June the mill owners met and decided that, as the business was unprofitable, wages must be reduced 12½ per cent. The working hours in Indian mills are from sun to sun, varying from 12 to 14 hours, and the daily wage varies from 10 to 20 cents per day.

June 4th was fixed for the payment of wages earned in April. When the money was paid to the help and they found that their wages earned two months ago had been cut down one-eighth, the worm turned and they struck. The trouble was finally compromised by the men accepting the reduction for April with the understanding that the full rate should be paid thereafter. Twenty thousand hands were on strike for ten days. The conditions which this incident discloses are commended to the consideration of all those who desire to tinker with our tariff rates and bring the American worker into competition with the labor conditions of Asia.

## *DUTY ON ARTIFICIAL SILK YARN.*

The general appraisers at New York have decided the case involving assessment of duty on artificial silk yarns. The Collector assessed duty at the rate of 65 cents per pound and 25 cents ad valorem, classing the yarns as pyroxylin. The importers claim that the merchandise should be assessed at the rate of 20 per cent. ad valorem as unenumerated manufactured articles, or at the rate of 35 per cent. ad valorem as indurated fibre wire and manufactures of wood or other pulp.

The evidence showed that the yarns in question had been manufactured by a process which consists in dissolving cellulose, without decomposing the same, and causing the solution to flow in a thread or fibre-like stream into a bath containing a precipitant of cellulose, whereby the latter is precipitated from its solution in a thread or fibre-like form.

The general appraiser in his decision stated that the various letters patent issued to the patentees of the process under which this merchandise is made show that the cellulose used in making the same is silk or cotton waste, and that no nitrate or other chemical which is used in producing pyroxylin or collodion is used in this article. The testimony offered by the importers is also to the effect that their merchandise is a non-nitrated article and the report of the Government chemist who analyzed the same confirms the evidence. The merchandise in question is therefore a non-

nitrated cellulose article which may be made from cotton or silk waste.

As it clearly proved that the merchandise was made from cotton waste, and the duty originally assessed was erroneous, the question for decision remained as to whether it should be classed under unenumerated articles or indurated fibre and manufactures of pulp. The appraisers decided that it should not be classed under enumerated articles, but was properly dutiable under section 7, paragraph 385, as silk threads or yarns. The appraiser stated that the merchandise under consideration differed from that involved in a former case No. 3917. In this first case the article was made under the Fremery system which is a non-nitrated article, whereas the silk in the case above cited was made by the nitrate process and is a compound of pyroxylin or collodion.

## *EDUCATION AND WEALTH.*

The attention of various individuals who fear that the industrial progress of the South will be arrested by compelling children of tender age to attend school instead of working in the cotton mill called to the figures relating to school attendance and wealth production cited by Secretary Frank A. Hill of the Massachusetts State Board of Education in a recent address at Springfield, Mass. He called attention to the greatly superior productive capacity of the State of Massachusetts per capita as compared with the average production for the United States, and ascribed this increase largely to the superior educational facilities which Massachusetts possessed. The speaker stated that the net results of productive industry in the United States amounted to 37 cents per working day for each man, woman and child, while for Massachusetts it amounted to 66 cents per day. He also stated that each child in Massachusetts received on an average seven years of schooling, while the average for the nation at large was only 4 3/10 years.

As the speaker admitted, all of this superiority of Massachusetts in productive capacity cannot be ascribed solely to her superior educational facilities. The location of mills and workshops in Massachusetts on account of the vast water power of her streams made this State the centre of many manufacturing industries. The resulting wealth enabled her people to increase the facilities for education. Education and the production of wealth travel hand in hand as the statistics referred to conclusively show. The value of education as a wealth producer is measured not only by the time given to study but chiefly by the direction given to the training of minds and bodies.

## *SELLING OF PRINT CLOTHS.*

The method of selling the product of the Fall River print cloth mills through a selling committee has not proved entirely satisfactory, and during the past month there has been more or less talk as to a change.

The practical difficulties experienced have arisen from the unwillingness of individual mills to agree to the propositions of the committee in regard to prices. As a result the members of the committee frequently found that they formed a selling committee that could not sell. The Fall River committee were thus forced to maintain prices at a higher level than their judgment approved and until such time as the logic of the situation impressed itself sufficiently upon the minds of the unwilling manufacturers. The course gave the outside manufacturer an opportunity to book earlier orders. The Fall River mills simply "held the umbrella" over the heads of outside competitors.

As long as the committee do not directly represent the stockholders this state of affairs is bound to arise. The remedies suggested are an actual consolidation of the mills or the for-

mation of a corporation to sell the goods on a plan similar to that adopted by the Southern cotton yarn spinners.

The evils of competition among individual mills are too well known to permit of a return to that system, and if the present methods of selling are abandoned, it is probable that some substitute will be adopted to prevent the indiscriminate slashing of prices when each mill operates alone.

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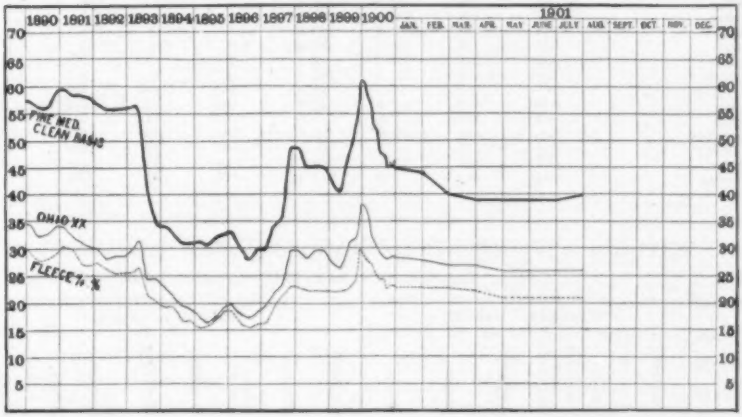
*WOOL MARKET.*




A large proportion of the new clip has passed from the hands of the grower into the possession of dealers and speculators. The opening of light weight goods at a decline of but 10 per cent. since one year ago as compared with a decline of about 30 per cent. in wool values during the same time, has cleared the situation in the goods market.

The result of these developments in the raw material and goods market has been reflected in a strengthening of quotation, which warrants us in giving the lines in our chart an upward turn after the long and weary downward course, which has continued without material interruption since the beginning of 1900.

The greatest improvement has been in fine wools, but even the coarse wools which have been such a drug on the market have shown decided signs of improvement.

Much of the alarm at the reduction made by the American Woolen Co. on their light weight goods has been allayed by a calm survey of the situation. The prices with which the new quotations are compared were made when wool cost nearly 40 per cent. more than at present. Aside from the advantage coming to this concern in having the production of their looms sold up, they are justified in reducing prices by reason of the reduced cost of wool alone.

The new clip has been transferred to new hands at prices fully up to recent quotations, and the new owners are not likely to part with their property except at an advance. Reports indicate that a fair volume of goods are being purchased; this will bring the manufacturer on the market as a purchaser of wool, as it is understood that the mills are carrying light stocks. For these reasons it is probable that in the ordinary course of business the coming months will witness an advance in wool values.

## EXPORTS AND IMPORTS OF RAW WOOL, YARN AND WASTE.

Lbs. in units of one million. Value in units of $'00,000.

| Year Ending June 30. | Exports. | | Imports. | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Wool. | | Wool. | | Shoddy, Noils, etc. | | Yarn. | |
| | Lbs. | Value. | Lbs. | Value. | Lbs. | Value. | Lbs. | Value. |
| **1890** | .231 | .335 | 106.3 | 152.6 | 5.0 | 20.5 | 3.5 | 19.9 |
| **1891** | .291 | .394 | 129.3 | 182.4 | 1.2 | 4.3 | 2.0 | 11.9 |
| **1892** | .202 | .306 | 148.7 | 196.9 | .3 | .9 | 1.3 | 7.5 |
| **1893** | .091 | .148 | 172.4 | 210.6 | .3 | 1.1 | 1.2 | 6.9 |
| **1894** | .520 | .906 | 55.2 | 61.1 | .1 | .5 | .5 | 3.6 |
| **1895** | 4.289 | 4.844 | 192.8 | 229.9 | 14.1 | 19.8 | 2.4 | 11.7 |
| **1896** | 6.945 | 8.559 | 228.4 | 315.0 | 18.7 | 26.5 | 2.0 | 10.5 |
| **1897** | 5.271 | 6.199 | 386.6 | 567.5 | 49.9 | 69.3 | 1.8 | 9.6 |
| **1898** | .121 | .180 | 132.8 | 167.8 | 3.3 | 6.9 | .3 | 1.9 |
| **1899** | 1.653 | 2.373 | 76.7 | 83.2 | .3 | .7 | .2 | 1.1 |
| **1900** | 2.200 | 3.872 | 155.9 | 202.6 | .4 | .9 | .2 | 1.3 |
| 6 mos. | .107 | .115 | 44.0 | 51.9 | .388 | 1.089 | .105 | .702 |
| Jan. | .018 | .018 | 9.2 | 10.6 | .048 | .16 | .028 | .15 |
| Feb. | .042 | .089 | 7.5 | 8.3 | .037 | .11 | .011 | .08 |
| March | .004 | .004 | 10.3 | 14.6 | .039 | .13 | .013 | .08 |
| April | .002 | .003 | 8.9 | 11 | .043 | .14 | .039 | .24 |
| May | .004 | .005 | 16.5 | 18.75 | .046 | .15 | .028 | .16 |
| June | .014 | .015 | 7.8 | 8.15 | .017 | .03 | .011 | .07 |

## EXPORTS AND IMPORTS OF MANUFACTURED WOOLENS.

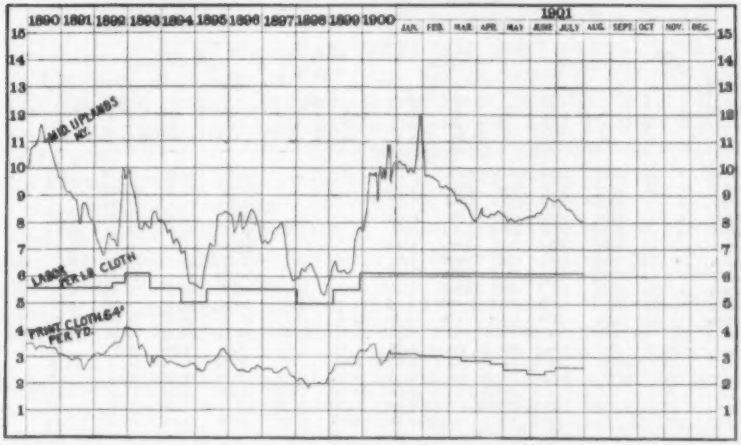
Value in units of $100,000.

| Year Ending June 30. | Exports — Value. | | | | | | Imports — Value. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Carpets. | Dress Goods. | Flannels and Blankets. | Apparel. | Other. | Total | Carpets. | Cloths. | Dress Goods. | Shawls. | Clothing | Knit Goods. | Other. | Total. |
| **1890** | .067 | .. | .409 | 3.179 | .719 | 4.374 | 7.5 | 161.4 | 242.0 | 10.1 | 18.4 | 19.8 | 66.2 | 525.4 |
| **1891** | .184 | .. | .265 | 4.240 | .502 | 5.191 | 13.7 | 120.3 | 182.4 | 7.2 | 18.6 | 12.5 | 39.7 | 394.4 |
| **1892** | .093 | .. | .244 | 2.689 | .649 | 3.675 | 12.9 | 127.6 | 164.7 | 3.5 | 14.8 | 11.6 | 12.1 | 347.2 |
| **1893** | .115 | .. | .242 | 2.224 | .679 | 3.260 | 15.8 | 151.2 | 161.8 | 2.8 | 11.7 | 14.1 | 12.0 | 372.4 |
| **1894** | 2.500 | .. | .387 | 3.172 | 1.685 | 7.744 | 9.6 | 67.6 | 85.8 | 1.6 | 8.6 | 10.0 | 7.2 | 190.4 |
| **1895** | 1.610 | .. | .498 | 3.161 | 1.432 | 6.701 | 13.6 | 163.0 | 144·0 | 2.0 | 10.0 | 9.4 | 11.8 | 353.8 |
| **1896** | 2.252 | .. | .370 | 3.053 | 2.860 | 9.135 | 8.9 | 218.9 | 199.3 | 4.5 | 13.0 | 25.4 | 27.4 | 497.4 |
| **1897** | 1.895 | .. | .573 | 3.858 | 3.150 | 9.476 | 7.8 | 170.1 | 167.9 | 4.6 | 9.8 | 25.3 | 27.0 | 412.5 |
| **1898** | 1.642 | .414 | .474 | 4.290 | 4.074 | 10.89 | 17.9 | 39.6 | 60.4 | .4 | 7.6 | 3.9 | 9.6 | 139.4 |
| **1899** | .811 | .169 | .427 | 5.388 | 3.679 | 10.47 | 17.6 | 39.1 | 59.1 | .5 | 8.3 | 6.3 | 5.6 | 136.5 |
| **1900** | 1.150 | .344 | 1.002 | 5.654 | 4.485 | 12.54 | 27.5 | 51.3 | 58.7 | .8 | 9.9 | 5.0 | 6.3 | 159.5 |
| 6 mos. | .471 | .040 | .583 | 3.909 | 3.107 | 8.17 | 13.57 | 21.71 | 24.95 | .51 | 7.29 | 2.69 | 2.61 | 73.33 |
| Jan. | .110 | .044 | .165 | .578 | .255 | 1.15 | 1.98 | 5.57 | 8.21 | .02 | .34 | .12 | .59 | 16.83 |
| Feb. | .125 | .012 | .037 | .80 | .199 | 1.17 | 1.87 | 3.99 | 6.33 | .04 | .62 | .19 | .57 | 13.61 |
| March | .098 | .008 | .080 | .66 | .46 | 13.06 | 2.16 | 2.52 | 4.98 | .04 | 1.07 | .48 | .34 | 11.39 |
| April | .066 | .001 | .015 | .78 | .30 | 11.62 | 2.73 | 1.61 | 2.81 | .06 | .52 | .21 | .32 | 8.26 |
| May | .110 | .001 | .150 | .55 | .40 | 10.76 | 3.11 | 1.73 | 2.29 | .02 | .69 | .19 | .44 | 8.19 |
| June | .07 | .001 | .198 | .73 | .28 | 12.79 | 1.62 | 2.76 | 4.19 | .05 | .65 | .33 | .37 | 9.97 |

—For twenty-five years, says the Pittsburg Leader, the Greene Co., Pa., record for sheep shearing has been held by W. B. Miller of Carmichaels, Pa. So far this season Mr. Miller has clipped the wool from 1,572 sheep, averaging 56 a day. In one day he sheared 71, the fleeces averaging 6½ pounds. In one season he sheared 1800 sheep. He has clipped the fleece from 40,000 sheep, and if they all averaged 6½ pounds to the fleece, as this year's sheep have, he has clipped 260,000 pounds.

—The manufacture of woolen knit goods worn by the people of Newfoundland, is an exclusively household industry. The wool is carded on hand cards and spun on the old fashioned spinning wheels; the yarn is then knit by hand into underwear and hosiery. To supply this industry hand cards valued at $1107 were imported last year into Newfoundland, of which all but $61 worth came from the United States.

## *COTTON MARKET.*


1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900
1901
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
MID. UPLANDS
LARDS PER LB. CLOTH
PRINT CLOTHS 64' PER YD.

Spot cotton has steadily declined during July. This downward tendency has not been so pronounced on future contracts.

The attention of the trade is now absorbed in the progress of the new crop. The drought, which at one time threatened serious damage, fortunately passed without material injury to the growing cotton, and since then weather conditions have been favorable.

The conditions in both home and foreign goods markets are far from satisfactory; the Continental mills especially, are finding it difficult to keep the looms in operation, many of them being on short time.

English mills are fairly well employed at present, but their contracts do not cover a very extended period, and the near future is awaited with considerable anxiety.

In the domestic markets cotton goods are in slightly better request, although prices have not advanced sales of print cloths are still of small volume and the quotations are unchanged.

The indications point to a fair crop for this season, and it is difficult to find reasons on which to base an opinion that the price of the staple will undergo a material advance.

The large stock of cotton in sight has dissipated all fears of a fall "squeeze" similar to that of last year. The Chronicle estimates the world's stock in sight July 26th at 2,306,521 bales, as compared with 1,405,722 bales in 1900, 3,144,925 bales in 1899, and 2,607,462 bales in 1898.

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—The American Protective League has issued a blank form which they are sending to importers throughout the country for the purpose of securing information as to the much discussed question concerning the difference between the prices charged in the United States for protected products, and the prices at which the same goods are sold to foreign customers.

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—A large textile mill in Turcoing, France, employs air pressure for raising water from wells to supply their plant. The plant is said to work successfully. The air is forced into the wells and in this way the water is ejected.

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—In the Lyons district there are, according to a recent official report, 33,069 looms for weaving silk goods, of which 17,935 were working on commission as distinguished from the other 15,134 which are operated by manufacturers on their own account.

## EXPORTS AND IMPORTS OF RAW COTTON AND WASTE.

Lbs. in units of one million. Value in units of $100,000.

| Year Ending June 30. | Exports. | | | | | | | | | Imports. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sea Island. | | Other. | | Total. | | | Cotton Waste. | | Raw Cotton. | | | Cotton Waste. | |
| | Lbs. | Value. | Lbs. | Value. | Lbs. | Value | Value. per lb. | Lbs. | Value. | Lbs. | Value. | Value per lb | Lbs. | Value |
| **1890** | 9 | 23 | 2462 | 2486 | 2471 | 2509 | 10.15 | .. | .. | 8.6 | 13.9 | 16.16 | .. | .. |
| **1891** | 14 | 31 | 2893 | 2876 | 2907 | 2907 | 10.00 | .. | .. | 20.9 | 28.2 | 13.49 | .. | .. |
| **1892** | 19 | 16 | 2926 | 2568 | 2945 | 2584 | 8.77 | .. | .. | 28.7 | 32.1 | 11.18 | .. | .. |
| **1893** | 8 | 17 | 2204 | 1870 | 2212 | 1887 | 8.53 | .. | .. | 43.4 | 46.9 | 10.80 | 1.9 | .8 |
| **1894** | 14 | 29 | 2669 | 2080 | 2683 | 2109 | 7.82 | .. | .. | 27.7 | 30 | 10.83 | 2.7 | .9 |
| **1895** | 15 | 28 | 3502 | 2021 | 3517 | 2049 | 5.82 | .. | .. | 49.3 | 47 | 9.53 | 2.9 | 1 |
| **1896** | 19 | 38 | 2316 | 1862 | 2335 | 1900 | 8.13 | .. | .. | 55.3 | 66 | 11.98 | 6 | 2.1 |
| **1897** | 21 | 41 | 3082 | 2268 | 3103 | 2309 | 7.12 | .. | .. | 51.9 | 59 | 11.36 | 5.3 | 1.7 |
| **1898** | 16 | 28 | 3834 | 2277 | 3850 | 2304 | 5.98 | 19.1 | 7.9 | 52.7 | 50 | 9.48 | 6.7 | 1.5 |
| **1899** | 14 | 24 | 3759 | 2072 | 3773 | 2096 | 5.55 | 21.1 | 8.3 | 50.2 | 50.1 | 9.98 | 6 | 2.1 |
| **1900** | 18 | 30 | 3082 | 2388 | 3100 | 2418 | 7.80 | 38.6 | 17.7 | 67.4 | 79.6 | 11.81 | 7.9 | 2.4 |
| **6 mos.** | 3.4 | 7.5 | 1833.3 | 1785.6 | 1836.7 | 1793.1 | 9.76 | 27.05 | 14.41 | 20.84 | 29.96 | 14.37 | 3.19 | .97 |
| **Jan.** | 1.83 | 3.7 | 367.6 | 354.8 | 369.4 | 358.5 | 9.75 | 4.94 | 2.52 | 5.59 | 8.66 | 15.5 | .48 | .15 |
| **Feb.** | 1.15 | 2.2 | 233.2 | 221.2 | 234.3 | 223.4 | 9.55 | 5.20 | 2.67 | 4.39 | 6.82 | 15.5 | .14 | .04 |
| **March** | .95 | 1.80 | 299.8 | 266.4 | 300.8 | 268.2 | 8.91 | 4.15 | 2.09 | 3.89 | 6.20 | 15.9 | .69 | .18 |
| **April** | 2.13 | 3.84 | 257.4 | 218.8 | 259.6 | 221.9 | 8.54 | 2.93 | 1.67 | 4.34 | 6.51 | 15.0 | .30 | .12 |
| **May** | 1.43 | 2.51 | 208.8 | 169.4 | 210.2 | 172.4 | 8.20 | 3.01 | 1.44 | 3.88 | 5.06 | 13.4 | .68 | .19 |
| **June** | .44 | .74 | 11.3 | 98.62 | 119 7 | 99.36 | 8 30 | 3.25 | 1.53 | 3.76 | 4.66 | 12.3 | .64 | .22 |

## EXPORTS AND IMPORTS OF MANUFACTURED COTTONS.

Value in units of $100,000.

| Year Ending June 30. | Exports — Value. | | | | | Imports — Value. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Colored. | Uncolored. | Apparel. | Other. | Total. | Colored. | Uncolored. | Apparel | Laces, etc. | Thread. | Knit Goods. | Other. | Total. |
| **1890** | 29 | 55 | 2 | 14 | 100 | 33.7 | 1.8 | 3.4 | 114.5 | 9 | 71.5 | 65.8 | 299.2 |
| **1891** | 26 | 93 | 3 | 15 | 137 | 42.4 | 1.7 | 12 | 105.9 | 8.6 | 67.4 | 59.2 | 297.2 |
| **1892** | 23 | 87 | 4 | 16 | 132 | 45 | 1.4 | 12.6 | 112.5 | 6.6 | 58.3 | 46.7 | 283.1 |
| **1893** | 28 | 63 | 5 | 22 | 118 | 55.4 | 2.6 | 16.8 | 127.4 | 7.6 | 68.9 | 61.8 | 335.5 |
| **1894** | 38 | 76 | 5 | 24 | 143 | 33.8 | 1 | 16.6 | 80.2 | 3.3 | 43.6 | 45 | 223.5 |
| **1895** | 35 | 70 | 5 | 28 | 138 | 54.3 | 1.2 | 27.7 | 116.9 | 6.6 | 65.4 | 59.9 | 332 |
| **1896** | 34 | 95 | 7 | 32 | 168 | 49.2 | 1.8 | 26.8 | 108.8 | 8.7 | 61.9 | 67.1 | 324.3 |
| **1897** | 48 | 125 | 9 | 29 | 211 | 44 | 2.7 | 26.3 | 125.7 | 6.5 | 56 | 83 | 344.2 |
| **1898** | 41 | 92 | 9 | 25 | 167 | 53.1 | 1.2 | 10.5 | 117.7 | 6.9 | 40.3 | 42.9 | 272.6 |
| **1899** | 52 | 138 | 13 | 30 | 233 | 66.5 | 1.1 | 10.3 | 145.5 | 8.5 | 43.4 | 45.3 | 320.6 |
| **1900** | 48 | 132 | 16 | 37 | 233 | 81.6 | 3.6 | 12.4 | 192.1 | 21 | 47.2 | 55.3 | 413.2 |
| **6 mos.** | 27.18 | 28.46 | 7.97 | 15.71 | 79.32 | 25.66 | .99 | 7.16 | 99.98 | 9.64 | 22.54 | 28.76 | 194.73 |
| **Jan.** | 4.95 | 3.41 | 1.11 | 2.57 | 12.04 | 12.48 | .22 | 1.25 | 22.16 | 1.30 | 4.99 | 3.72 | 46.12 |
| **Feb.** | 4.96 | 4.96 | 1.16 | 2.38 | 13.46 | 7.49 | .31 | 1.66 | 19.76 | 1.34 | 6.91 | 4.11 | 41.58 |
| **March** | 4.92 | 7.08 | 1.40 | 2.82 | 16.22 | 4.77 | .16 | 1.85 | 18.59 | 1.38 | 6.59 | 3.72 | 37.06 |
| **April** | 8.76 | 5.80 | 1.65 | 2.70 | 18.91 | 3.48 | .12 | 1.25 | 17.40 | 1.23 | 5.67 | 3.33 | 37.48 |
| **May** | 7.36 | 8.66 | 1.68 | 3.19 | 20.79 | 2.68 | .04 | 1.10 | 13.44 | 1.32 | 4.81 | 3.80 | 27.23 |
| **June** | 7.49 | 17.32 | 1.18 | 3.39 | 29.38 | 2.53 | .08 | 1.00 | 11.34 | 1.16 | 3.09 | 3.99 | 23.19 |

—Our readers will remember that, following the agitation in England against the weighting of worsted coatings, an agreement was made by a number of dyers to abandon the practice. This plan of putting an end to the weighting of worsted goods failed, because the trade demanded such adulterated fabrics; both dyers and tradesmen were forced to yield to the pressure. Another plan has now been adopted, which it is expected will give good results in the way of restricting the use of weighted goods. The Leeds dyers have agreed to mark all goods not weighted, with a registered stamp to show that they are made of pure wool. It is stated that at least 75 per cent. of the trade are bound by this new agreement. It is expected that the use of the stamp will protect the public and eventually put a stop to the practice of weighting.

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—Never! This is the first word of every woman as forever is the last.—Houssage.

## The Knit Goods Situation.

The past month has been a decidedly quiet one in underwear and hosiery circles so far as the selling agents and commission men are concerned, although retail business throughout the country has been remarkably good.

With business on Fall goods practically completed and Spring lines not yet fully in shape it is a "between seasons," time, but the general opening up of Spring lines in the very near future will undoubtedly result in renewed activity throughout the market.

While many lines of Spring underwear are practicaly completed now and some fair sized orders from Western jobbers have already been booked, the majority of underwear agents will not place their lines on sale until early in August and there is a tendency to withhold quotations until as late a date as possible. It is the general opinion among underwear agents that it would be a most desirable state of affairs if the general opening could be held back until August is well advanced, but it is extremely doubtful if this can be accomplished, although there is no question but that the business will not be done as early this year as was the case last season and the season before.

Quotations which have already been made are in almost every instance a trifle lower than those of last season; for instance, one prominent line of Men's Balbriggan which sold last season at $3.87½ is quoted in this season's line at $3.75, and in many cases where prices are maintained, better values are being given either in better grades of yarn or in improved finishing and trimmings; but there has recently developed a strong upward tendency, and, we venture to say, that before the season has far advanced many changes in prices will be made and it would not be suprising if prices would rule as high as those of last season.

There is every indication that large lines of fancies will be shown both in solid colors and fancy weaves, particularly stripes. Some handsome novelties have been produced by one of the leading manufacturers of high grade goods in men's derby ribbed underwear, in solid shades of blue, lavender, tan, black, pink, and salmon and also in fancy effects, largely stripes.

Some uneasiness is being evinced with reference to the prospects of trade in the west, owing to the serious condition of affairs in the states of Nebraska, Iowa, Missouri, and Kansas, as a result of the damage to the corn crop by the continued drought and hot weather.

In the line of ladies' underwear a most pronounced tendency is noticed towards the producing of more elaborately trimmed and embroidered garments than has neretofore been attempted, and there is every indication that these fancy vests will be in strong favor for the summer season of 1902. Fancy color combinations will also be good.

Hosiery lines are not so far advanced as the underwear and, although new styles are being shown here and there, no complete lines have yet been offered.

In domestic goods, ladies' full fashioned hose and also seamless goods in lace and open work effects will undoubtedly be one of the strongest features, the principal colors being solid blacks and reds with a fair proportion of whites in the finer goods, the demand for which, by the way, has increased amazingly since our last writing and bids fair to be a feature of the coming season both in foreign and domestic goods.

As in the underwear market, prices on hosiery are slightly lower than last season, but whether or not recent quotations will be maintained throughout the season is a question which cannot be decided until later on.

In fabric gloves two clasp white silks have been in phenomenal demand and the manufacturers of these

goods report large sales and state their inability to keep up with their orders, but next season will undoubtedly find them better prepared to handle the trade. This is a class of goods, by the way, which until a few years ago were almost exclusively of foreign manufacture, while today the domestic manufacture reigns supreme and practically no silk gloves are brought in from the European markets.

Two clasp lisles have also been good and proved a close second to the silk glove but the demand in this line has been more easily met. The manufacturers of golf gloves are running on full time completing their fall orders and have all the business they can possibly handle for the season.

A development of the fancy knit goods market during the past few weeks has been the "trolley" cape and the Newport scarf. The trolley cape is a circular knit garment designed to be thrown over the head and shoulders as a light evening wrap, and has been very popular for seaside and mountain wear. This article has been a pronounced success and is sold principally in solid colors of blue, pink, white and black, also with dainty edge work in tasteful color combinations.

We illustrate two styles of trolley capes which have been very good sellers. Fig. 1 is made in solid colors of white, pink, blue and black with shell work in a combination of colors in a mercerized yarn. Fig. 2 is an entirely different stitch and comes in solid colors only.

The Newport scarf is knit in a long narrow strip, usually about 20 inches wide by 54 to 60 inches in length, and is used principally as an article of head wear.

The Chemnitz market, owing to the recent slight advance in cotton yarn, rules a little firmer than at our last writing but prices are practically the same on staple goods.

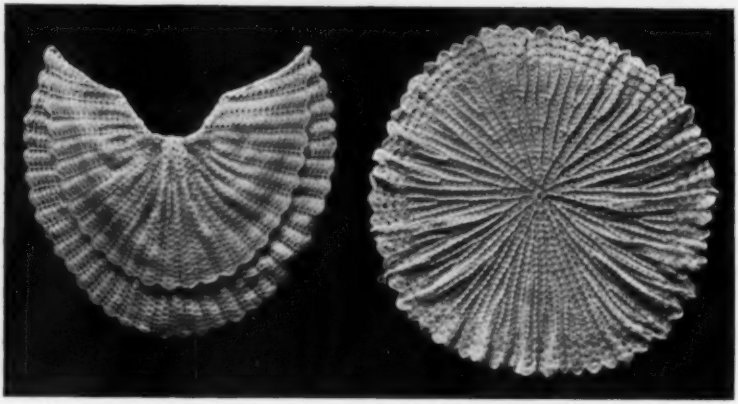

FIG. 2. FIG 1.

The demand for lace hose both in ladies' goods and men's half hose continues to increase and manufacturers have more than they can do to keep up with their orders without attempting to make up for stock. Black, is, of course the principal color and red is also considered very favorably by American buyers, many of whom have just returned, but they have not yet received their samples of the new spring lines except in a very few instances. Fancy striped hosiery will also hold good for another season but nothing decidedly new in the way of novelties are being shown.

In foreign gloves lace effect frame goods will be the favorite and have been bought more readily than the plain goods.

## The Evolution of the Crossbred.

*BY S. B. H.*

During the past ten years there has been a complete revolution in the wool trade of the world. The time was, and not long ago either, when both growers and buyers used to contemplate wool in the sole light of merino qualities, crossbreds hardly entering into the consideration of the trade, or at least the trade of Europe and America. That is easy to be accounted for when it is remembered that all the imports into England consisted of over 80 per cent. of fine grade merino wools.

Today, however, crossbreds are just about as plentiful as merinos, and while in 1890 80 bales out of 100 consisted of merino growth, that number has been steadily decreasing until today not more than 50 bales out of 100 are merino wools. To show what has been the real movement of affairs, I will give an illustration of how matters stand from the actual importations of foreign wools into England.

COLONIAL AND RIVER PLATE WOOL.

Imports for the season in million lbs. clean wool.

| Year. | Total. | Estimated. Merino. | C'bred. | Proportion of Crossbred. |
|---|---|---|---|---|
| 1889 | 429 | 355 | 74 | 17.2 per cent. |
| 1891 | 462 | 380 | 82 | 17.7 " " |
| 1893 | 497 | 382 | 115 | 23.1 " " |
| 1895 | 580 | 396 | 184 | 31.7 " " |
| 1897 | 586 | 354 | 232 | 39.6 " " |
| 1899 | 574 | 212 | 262 | 45.6 " " |

It will be seen that while the importations of crossbreds have since 1895 increased by fully 40 per cent. and more than trebled in ten years, the proportion of merino has during the past four years decreased 84 million pounds, or more than 20 per cent.

It is a well known fact that since 1888 South America, when the work of converting merino flocks into crossbreds was started there, has continued the process in a most striking manner; we hardly think that New Zealand, who was the pioneer of the crossbred craze, proceeded at such a rapid rate in turning her merino flocks into crossbreds, while Australia stands today almost intact as a merino wool producing country, the actual figures of the latter country based on the wool exports for the last year showing in the aggregate a wool export of 85 per cent. merino, and 15 per cent. of crossbred wool.

It is worth more than a passing glance to see what strides the River Plate has made in the conversion of its flocks from merinos into crossbreds, and the following table is of special interest at this moment in view of the present state of the market for merino wool:—

RIVER PLATE WOOL.

| | Total production Bales. | Percentage of Merino. | Production of Merino. Bales. |
|---|---|---|---|
| 1888 | 374,000 | 85 | 317,900 |
| 1892 | 415,000 | 75 | 311,000 |
| 1895 | 513,000 | 50 | 255,500 |
| 1898 | 555,000 | 40 | 222,000 |
| 1899 | 540,000 | 25 | 135,000 |

It will thus be seen that, although there is an increase in the total production of about 170,000 bales, there is a positive decrease of merino of some 180,000 bales during eleven years.

In view of these facts, it must be evident that merino wool no longer ocupies its old time monopoly in the market. This must not be interpreted as meaning that the "good old" days of the past, when merino wool was worth something, are forever gone, nothing of the sort; but the very large quantities of cheap foreign crossbreds will always continue to play a very important part in influencing for good or otherwise, the grand, soft, silky staple of the merino.

In 1899 fine wools rose to a price that has not been equaled since 1872, only to be followed last year by a corresponding unparalleled slump, but it seems to have been overlooked that fall crossbreds have been a far greater factor in this decline than the financing of the dearly purchased wool; it was the knowledge that there was a vast stock of very cheap crossbreds on hand that caused fabric buyers to refuse to have anything to do with the excessively high priced merinos, choosing at the critical time to patronize the cheap crossbred in preference

to the dear merino. These remarks naturally lead us to the subject of the evolution of the crossbred, for figuring so largely in the market their origin and their peculiar characteristics will well repay a brief study.

English and American sheep farmers during the last two or three years, have bitterly complained about the very low prices received for their fleeces, and the question is frequently heard: What's the cause? In answering, we say at once that fashions have not entered into the transactions in the least, it being simply the presence in the market of excessive quantities of colonial crossbreds that has been the great reason of sending down values of English crossbred wools. The 60,000,000 of colonial and foreign crossbred sheep are the result of mating the pure bred English crossbred sire with the pure bred merino, the progeny being of course termed "half-bred," or "crossbreds."

We illustrate at Fig. 1 a sample of merino wool which shows some of the characteristics of that grade. This sample was taken from a very well grown shafty Australian fleece of wool, which, as the reader will see, is very fine in quality, of a good length, very robust and sound. The staple is very soft and silk-like, very fine in quality and represents the work of very careful and systematic breeding for a number of years. The results of arduous toil and systematic culling of the past 100 years by Australian sheep breeders are to be seen today in Australian merino wool that has no equal.

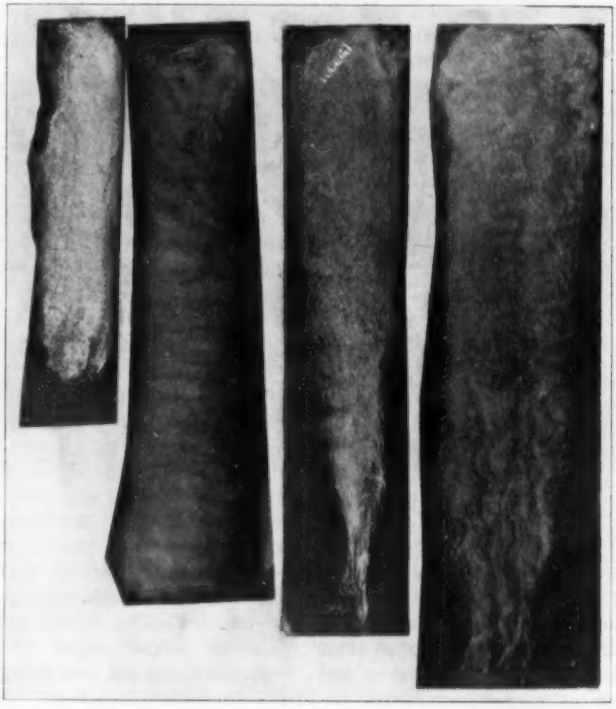

FIG. 1. FIG. 2. FIG. 3. FIG. 4.

I believe Australia will ever remain pre-eminently the home of the pure merino and that, judging by the results of attempts in certain sections of Australia to breed crossbred sheep and grow crossbred wool, the Australian crossbred, generally speaking, will not

equal this grade of wool grown in New Zealand, though in certain well watered and well grassed country in Australia, the crossbred can be as successfully reared as in any other part of the world. But, on the principle of letting well enough alone, Australia will serve her best interests by sticking to the merino, and making that her specialty. Merino wool will always be wanted and, as population increases and the public becomes educated to the benefits of clothing, particularly under-clothing made from wool in preference to cotton, consumption is bound to grow with a corresponding increase in price.

But what a marked difference in the staple do we see when we come to the wool from the progeny of the first cross of the merino ewe with say a Lincoln or Leicester ram, commonly known as "half-bred" wool. A glance at Fig. 2 will show that the introduction of the pure crossbred blood gives to us an altogether different character of staple to that seen in Fig. 1.

This half-bred wool is at least 2 inches longer in the staple, much stronger and coarser than the pure merino. The tops of the staple clearly shows this, while throughout the entire length the half-bred wool shows a good deal more waviness than the pure merino, this being caused by the stronger fibres being more crimpled, though in reality the number of crimps per inch in the merino which here are indiscernible or nearly so, indicate the superior fineness of the merino over the half-bred. These half-bred wools are neither coarse nor fine, but fill the bill very well in the manufacture of good, plain, practical fabrics for the use of the million.

We now come to what is known as "three-quarter-bred" wool, or in other words, a wool in which is two-thirds of pure crossbred blood, and one-third of merino blood. The evolution of this style of wool is simply produced by the crossing of the "half-bred" by the pure-bred crossbred ram, the progeny of which consists of two parts of crossbred and one part merino.

A glance at the staple shown at Fig. 3, shows the effects of this second cross upon the wool. It will be seen that here we get another increase in breadth, in density, and, what is of the most importance, a decrease in quality when compared with the wool of the "half-bred." These "three-quarter-bred" wools are commonly known in the trade as wools of a 40's quality, and which today are in greater demand than all the other qualities put together.

The fibres are to be seen standing stiff and straight and the "curl" has nearly disappeared. This wool is usually sound and strong, though soft and supple, and is used for a great variety of fabrics.

The next process in the evolution of the crossbred is that of its reverting back to the full blood crossbred from which it started on the male side, the progeny of the second cross after being mated with the pure pedigreed crossbred ram producing a class of sheep known as the full blood crossbred; this wool is shown at Fig. 4. A study of this third cross wool shows a further development in point of density, bulkiness, length and strength of fibre, or a class of wool that, while being of a useful type, is more at the mercy of Dame Fashion than are the wools of the second cross. Great care should be taken in the breeding of this class of wool, which needs close watching by sheep breeders. Oftentimes there is a fair sprinkling of kemps in fleeces below 36's quality, and sheep showing an undue tendency to grow an extra coarse fleece should be at once fattened and sent to the butcher.

Taking cognizance of all the circumstances which are affecting the calling of the sheep breeder, both at home and abroad, I see nothing for it but that in such countries as New Zealand, South America and possibly South Africa, flock masters will continue to devote more attention to the breeding for both mutton and wool, knowing that therby they will receive better returns than growing sheep for wool alone.

## The "Ross" Self Changing Shuttle Loom.

Nearly one half of the labor cost of cotton print cloths woven on the hand changing shuttle loom is due to the labor employed in weaving the goods. Consequently the loom offers the best field for the inventor of appliances to reduce the labor cost of cotton manufacturing.

It is estimated that fully one half of the labor required to operate the hand changing shuttle loom consists in changing the shuttles, in which the weave is required to stop the loom, take out the empty shuttle, put in a full one, start the loom, and fill the empty shuttle with a fresh supply of filling.

Thus the field for effecting large economies in the labor of cotton manufacturing is narrowed down to this operation of changing shuttles.

The progress made in this country in this direction has stimulated foreign inventors, and the illustrations accompanying this article show a self changing shuttle loom, the invention of H. R. Ross, Belfast, Ireland, which has been in operation in the Durham Street Mills, Belfast, for some time.

It has been designed to change or replace the shuttle when the weft breaks or fails, and is actuated automatically by the loom fork. The invention consists in applying to the loom a cage or receptacle to receive a number of threaded shuttles, a revolving box on the end of the sley, which is fitted with slides and cams to discharge empty shuttles; and suitable levers for connecting the weft fork with the actuating mechanism for rotating the shuttle box and other parts of the invention.

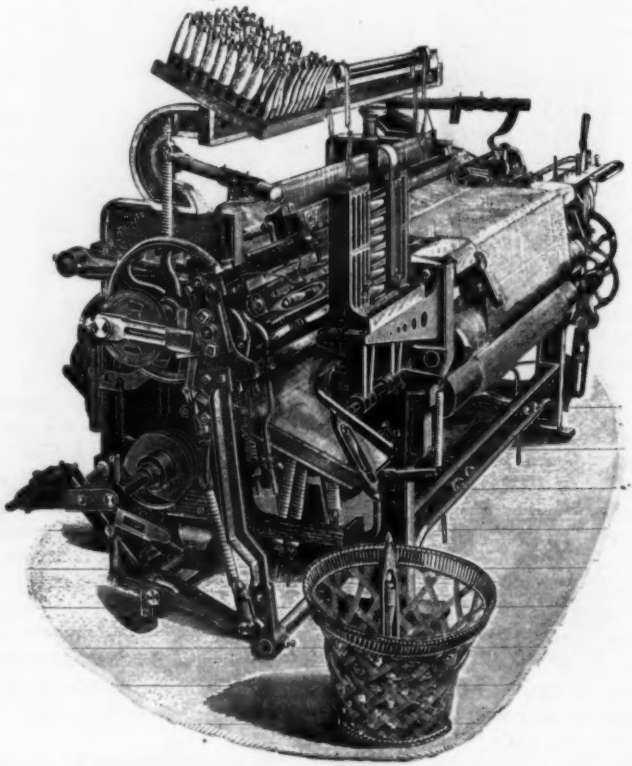

FIG. 1.

Fig. 1 is a general view of the loom

equipped with this device. Figs. 2 and 3 are front and end elevations respectively, designed to show the principal parts of the motion. The receptacle for the shuttle is shown at H, and the shuttles are placed therein one above the other, whence they are delivered one at a time by a reciprocating bar or pusher h.

To the end of the sley B, oscillating therewith, the inventor attaches circular revolving shuttle box K, having four chambers to receive the shuttles in at the sides. Each chamber is provided with a spring or swell $k^1$, with out-turned lip of a shape suitable to permit of the shuttle compressing the spring as it enters the chamber from the receptacle H. Each chamber of the revolving shuttle box is also fitted with slides in the bottom, which expel the shuttles from the chamber.

It is stated that the loom has been thoroughly tested, and the claim is made that it is simple in construction and easily mastered by loom fixer and weaver, besides being cheaper to build; also that one weaver can attend three or four times as many looms as at present with an increased production per loom. The American rights for this loom are for sale. Any information in regard to the matter can be obtained by addressing the inventor and proprietor, H. R. Ross, Durham St., Mills, Belfast, Ireland.

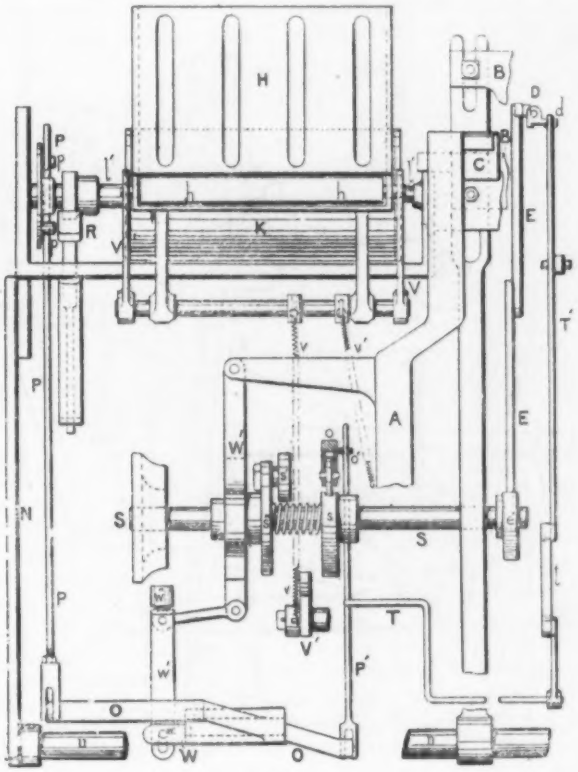


FIG. 2.

—A U. S. patent has been granted for mercerizing cotton in the form of slubbing. The process itself is the same as that now in use and the patent appears to be simply on the use of cotton in the form of slubbing, which is afterwards spun or torn up and converted into a fibrous mass.

## Cost Finding.

BY E. W. THOMAS AGENT OF TREMONT AND SUFFOLK MILLS.

Conclusion of second lecture delivered at the Lowell Textile School.

(Continued from June).

Let us now take up the cost of carding. We have here a copy of the cost sheet (see Table I), as worked out by the card room overseer, and handed to the office, excepting the figures in the last two lines. These are filled in at the office for reason that will be given later.

Let us now take this Card Room cost sheet and explain it. We find that in this room, or mill, we are making, as per heading, four different numbers of roving, viz., 1.75 2.60, 4.00 and 4.50. The next line represents the number of Fine Spindles run on the average for the week on each number of roving. The next line represents the pounds of roving taken off by the frames, as read by the clocks, and figured out in pounds. The next line is the distribution of the wages, paid all operators on cards, say, grinders, strippers, alley boys, card clothiers, lap man, etc.

Here we find from our pay rolls that $146.41 was paid for the service. Then we divide $146.41 by 104,580 pounds, so as to get the cost per pound for this service, and we find the result to be 0.14; so that, to get the amount that should be charged to the 1.75 hank roving, we multiply 56,430 pounds by 14 cents, which gives $79.00, and in the same manner proceed with the amounts of other hank rovings made.

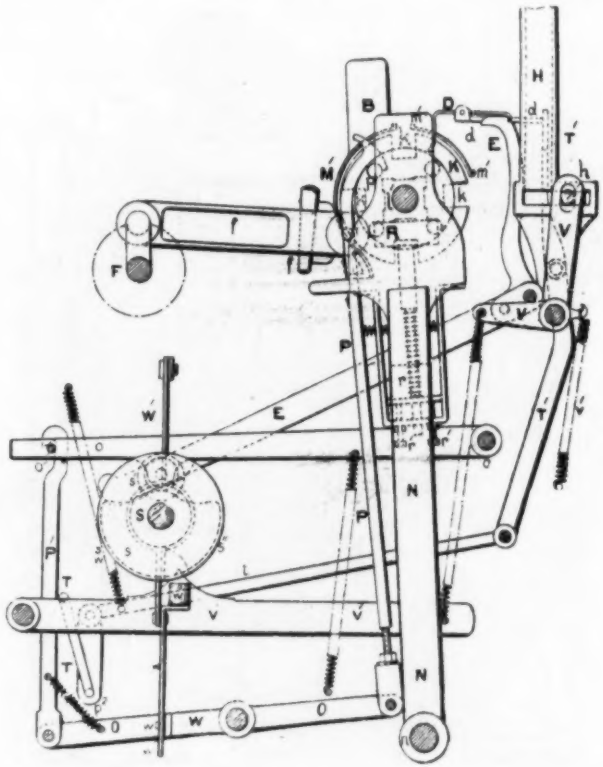


FIG. 3.

It is evident that so far as the strict

carding machinery is concerned, it costs as much per pound for one number of roving as another. The next line represents the amount paid for railway and drawing frame attendance; the total amount is $96.21. This amount divided by 104,580 pounds equals .092 cents, cost per pound for this class of work; each of the pounds produced under the different number of roving multiplied by the cost per pound (.092) gives $51.91 for the 1.75, $27.60 for 2.60 H. R., $9.17 for the 4 H. R., and $7.53 for the 4.50 H. R.

We assume that the cost of the attendance on railway heads, if used, on drawing frames will not cost more per pound on one roving than on another. This, however, may vary slightly according to circumstances, but in this particular mill, we have taken the weight of slivers on drawing frames for all the coarse roving at the same weight. The next line refers to cost of coarse roving production. Here the labor simply of the tenders is taken into account, and this division of the total wages ($93.07) paid these tenders, is in proportion to the pounds, on each number of roving, to the total number of pounds produced.

The next line is for cost of intermediate roving. This only applies in the No. 4 and 4.50 hank roving, there being three operations, while for the 1.75 and 2.60 hank roving but two operations of roving machinery are used. The subdivisions of the total amount paid on intermediate frames are simple, and do not require any time to be taken in explanation. The same is true of the next line, that is distribution of the $262.85 charged against the fine roving. The amount of money charged under each number of roving, for coarse, intermediate, and fine frame tenders, is naturally obtained through clock readings, and the aggregate money paid; the fine roving so-called being the roving sent to spinning, whether made from two or three processes.

We have now the last line, or that of general expense. We find the total amount paid out on this account is $171.54. We believe thoroughly in fully understanding how to subdivide this amount among the various rovings made. We find some who take this amount, which covers all other labor, with the exception of that enumerated in other lines, and divide it by the total number of pounds made, and the cost per pound is thus obtained. We believe, however, that it is better to divide this amount by the average number of fine or finished spindles run in this case. We have a total of 4765 spindles, and this divided into $171.54 equals 3.6 cents per spindle. Now we have 1875 spindles on 1.75 H. R. This multiplied by 3.6 cents equals $67.50. Pursue this same course in reference to the other hank rovings. 1350 spindles on 2.60 H. R.,

*Carding, Cost per Pound.*

| No. of Roving | 1.75 | 2.60 | 4.00 | 4.50 | Totals |
|---|---|---|---|---|---|
| Fine spindles run | 1,875 | 1,350 | 800 | 740 | 4,765 |
| Pounds Roving made | 56,430 | 30,020 | 9,972 | 8,158 | 104,580 |
| *Wages.* | | | | | |
| Carding | $79.00 | $42.03 | $13.96 | $11.42 | $146.41 |
| R. W. & D. F. | 51.91 | 27.60 | 9.17 | 7.53 | 96.21 |
| Coarse Roving | 50.22 | 26.72 | 8.87 | 7.26 | 93.07 |
| Int. Roving | ..... | ..... | 7.98 | 6.52 | 14.50 |
| Fine Roving | 130.99 | 75.00 | 28.96 | 27.90 | 262.85 |
| Gen. Expenses | 67.50 | 48 60 | 28.80 | 26.64 | 171.54 |
| Totals | $379.62 | $219.95 | $97.74 | $87.27 | $784.58 |
| Cost per Pound | .672 | .733 | .979 | 1.071 | .750 |
| Add 2½% | .017 | .018 | .025 | .027 | .019 |
| Actual Cost per Pound | .689 | .751 | 1.004 | 1.098 | .769 |

.36 per spindle ..... For General Expense.
.14 per pound ..... For Carding.
.092 per pound ..... For R. W. & D. F.
.089 per pound ..... For Slubbing.
.08 per pound ..... For Int. Roving.

TABLE I.

multiplied by 3.6 cents gives $48.60. Our next line is the addition of the various amounts expended on each operation of each kind of roving. These totals divided by the number of pounds of roving made, represent the costs per pound of the roving as indicated by hand clocks, and, as we stated before, we have produced 104,580 pounds of roving for only 101,935 pounds of cloth; consequently, these by the proportion or relation that 101,935 bears to 104,580; this is about two and one-half per cent. Consequently, we add two and one-half per cent. to our original costs, and find as the net cost of labor for the various number of roving:

| | |
|---|---|
| No. 1.75 H. R., equals | .689 |
| No. 2.60 H. R., equals | .751 |
| No 4.00 H. R., equals | 1.004 |
| No. 4.50 H. R., equals | 1.098 |
| Average cost per pound | .769 |

As the labor of working out cost sheets once per week is rather burdensome, it is customary in many mills to work out the figures covering the time from the last Saturday noon of one month to the last Saturday noon of the following month.

| | | |
|---|---|---|
| Drills..... | 12.50 | yarn, 60% of 55 825 = 33,495 lbs. |
| Sheetings.. | 21 | yarn, 50% of 29,699 = 14,850 lbs. |
| Pr. Cloths.. | 28 | yarn, 55% of 17,940 = 9,867 lbs. |

Total lbs. warp yarn required = 58,212 lbs.

WARP SPINNING—COST PER POUND.

| No. of Yarn..... | 12.50 | 21. | 28 | Totals. |
|---|---|---|---|---|
| Spindles run.. | 8,580 | 7,000 | 7,050 | 2',630 |
| Lbs. y'rn spun | 33,495 | 14,850 | 9 867 | 58,212 |
| *Wages.* | | | | |
| Doffers..... | $32.82 | $16.78 | $10.50 | $60.10 |
| Spinners..... | 85.80 | 50 04 | 53.08 | 16·.92 |
| Gen. Expenses | 42.90 | 35.00 | 35.25 | 113.15 |
| Total wages. | $161.52 | $101.82 | $98.83 | $362.17 |
| Cost per lb.... | .482 | .688 | 1.001 | .622 |
| Add 1¼ per ct. | .007 | .010 | .015 | .010 |
| Cost per lb.... | .489 | .698 | 1.016 | .632 |

TABLE K.

Then these costs for each of the six months are collected together, and a general cost sheet for a six months' period is made.

This system of working out costs, while taking some time, gives the overseers, who will faithfully work it up, the advantage of followng his costs closely every month, comparing one month with another and show at a glance, in case the cost for any one number of roving is excessive for any given month, just where to look for the cause, and in just what department. On this score alone, even if the figures were not wanted by the office for working out the full costs, it pays the overseer to work out his individual costs, that he may the more readily keep in touch with the cost of running his room, and if this system is pursued by others, he has the opportunity of making comparisons with some one in other mills, having charge of similar department to his.

We will take the Mule Spinning Room, and determine the cost of the different numbers of yarn in that department. We have to consider first the pounds of filling required. We find that all the yarns, both warp and filling, required on each grade of goods is as follows:

| | | | |
|---|---|---|---|
| Drills..... | 55,000 | plus 1½ per ct. = | 55,825 lbs. |
| Sheetings.. | 29,200 | plus 1½ per ct. = | 29,699 lbs. |
| Pr. Cloths.. | 17,675 | plus 1½ per ct. = | 17,940 lbs. |
| | 101,935 | | 103,464 lbs. |

So that, to produce 101,935 lbs. cloth, we must deliver to the weaving room 103,464 lbs. of yarn.

We find that on

| | |
|---|---|
| Drills | 40 per cent. is filling |
| Sheetings | 50 per cent. is filling |
| Print Cloths | 45 per cent. is filling |

Hence the number of lbs. of filling required will be as follows:

| | | | |
|---|---|---|---|
| Drills.... | No. 14 | yarn, 40% of 55,825 = | 22,330 lbs |
| Sheetin's | No. 23½ | yarn, 50% of 29,699 = | 14,849 lbs |
| Pr. Cl'hs | No. 38 | yarn, 45% of 17 940 = | 8,073 lbs |

Total lbs. filling required.... = 45,252 lbs

Referring now to following table, and we find the details of the mule filling room. This is a copy of cost sheet made out by overseer excepting items on two lower lines:—(See table J.)

This sheet may be treated as we did the Card Room sheet, it being very evident that it is an easy matter to first keep account of spindles run on each number of yarn, and the cost of doffers and back boys on each number. Naturally the spinner's account takes care of itself. In regard to general expenses, which in this case is $102.45 divided by total spindles 26,300, and the result is .039 of a cent as the cost per spindle for general expenses.

Then, taking the number of spindles run on each number of yarn, and multiplying by this constant, we find the exact amount that should be charged against each number of yarn for the general room expenses. It is not a correct method to divide the amount of general expenses by the lbs. produced, and use that figure as a constant, because the spindle basis is the best, as

MULE SPINNING—COST PER POUND.

| No. of Yarn..... | 14. | 23.50 | 37. | Total. |
|---|---|---|---|---|
| Spindles run.... | 8,600 | 9 700 | 8,000 | 26,300 |
| Lbs. yarn spun | 22,330 | 14 849 | 8,073 | 45,252 |
| | | *Wages.* | | |
| Doffers & Back Boys..... | $48.86 | $40.88 | $29.94 | $119.68 |
| Spinners..... | 96.50 | 102.29 | 80.34 | 279.13 |
| Gen. Room Ex. | 33.54 | 37.80 | 31.11 | 102.45 |
| Total wages. | $178.90 | $180.97 | $141.39 | $501.26 |
| Cost per lb..... | .801 | 1.220 | 1.750 | 1.108 |
| Add 1½ per ct . | .012 | .018 | .026 | .016 |
| Cost per lb....: | .813 | 1.238 | 1.776 | 1.124 |

TABLE J.

ordinarily no more work is put in per spindle on one number than on another of yarn by general room help.

Our next move is to work out cost of warp yarn. Here we have No. 12.50, 20 and 28 yarns on Drills, Sheetings, and Print Cloths, respectively. Pounds of yarn required are as follows: (See Table K.)

This table for warp spinning is made up of actual doffers and spinners' wages, as subdivided into the number of spindles run on each number. The general expense $113.15 is proportioned to the number of spindles run on each number; following out the same proposition used in carding and mule spinning rooms. The one and one-half per cent. added to the room cost of labor, is due to the fact that not all the warp yarn appears in the cloth by about one and one-half per cent., hence the cost is increased that amount to offset.

The next class of expense is that of Spooling. The pounds of warp yarn here are taken same as in ring warp spinning room, viz: (See Table L.)

| | |
|---|---|
| 12.50 yarn..... | 33,495 lbs. |
| 21. yarn..... | 14,850 lbs. |
| 28. yarn..... | 9,867 lbs. |
| | 58,212 lbs. |

SPOOLING—COST PER POUND.

| No. of yarn..... | 12.50 | 21. | 28. | Totals. |
|---|---|---|---|---|
| No. of spools run.. | 430 | 350 | 360 | 1,140 |
| Lbs. spooled..... | 33,495 | 14,850 | 9,867 | 58,212 |
| | *Wages.* | | | |
| Spoolers..... | $75.40 | $40.39 | $32.56 | $148.35 |
| Gen. expense..... | 23.65 | 19.25 | 19.80 | 62.70 |
| Total wages... | $99.05 | $59.64 | $52.36 | $211.05 |
| Cost per pound.... | .295 | .402 | .531 | .362 |

TABLE L.

General expense in this room, divided by the number of spindles running in all equals .055 of a cent, cost per spindle, and the number of spindles on each number of yarn, multiplied by this number .055 equals the amount to be charged each numbe of yarn for General Expenses. (See Table M.)

In this case, all charges are made against each kind of cloth, so far as it is possible, and general room expense is divided into the pounds of cloth of each kind made. Into this department the most detail enters, especially when a large variety of ends are made into warps.

The next operation is that of weaving: (See Table N.).

In making up this table, the price per pound for weaving is given. All other amounts on pay roll divided by total number of looms gives cost per loom for general expenses. This multiplied by the number of looms on each grade of goods, gives the amount to be charged against each grade for general expenses.

We have now finished up the department work, except the cloth room. There we ought to follow the same principle of charging to each grade of goods, the labor that goes into that specal line. It is obvious that a folding machine will get off more pounds of drills than of four-yard sheetings, or print cloths, and the same is true of inspecting, baling, etc.

If the majority of the different hands are paid by the "job," so-called, then the cost may be carried out very accurately; but if pay of operatives in cloth room is by the day, it is somewhat more difficult to estimate

costs of various goods in this department. But, take this mill in particular: We find that we have woven 55,000 pounds drills, 40 yards per cut divided by 2.85 yards equals 14.06 pounds, or 3919 pieces; 29,260 pounds per week of sheeting equals 53½ yards per cut, divided by 4 equals 13.40 pounds per piece, equals 2187 pieces; 17,675 pounds of print cloths per week equals 53½ yards per cut, divided by 7 equals 7.42 pounds per cut, or 2,312 pieces. So that we have to handle 3,919 pieces drills, 2,187 pieces sheetings, 2,312 pieces print cloths, a total of 8,418 pieces.

8,418 pieces in all, to be brushed, sheared, folded, inspected, and baled. Allowing that the machinery in the cloth room, of a like character, all runs at same speed, it is evident that as many yards of one kind will be handled as another by any one hand, or combination of hands.

Allowing $205 as weekly pay roll of cloth room, then the average price per piece of goods for handling would be $205. divided by 8418 equals 2.43 cents per piece.

We have now worked out in the various departments of the Mill, the costs of rovings and yarn in each operation. You, perhaps, will observe that in many of the calculations, details were closely entered into; some of those in general expense may be omitted, but I was obliged to introduce them, to fully illustrate the principles.

We will now combine the various costs of the different departments, taking first, the cost of picking, which we find is .120. This, we enter under the three kinds of cloth opposite picking.

The next item is warp carding. The percentage of warp carding in drills is 60, and we find that one pound of hank roving costs .689; we must therefore take 60 per cent. of this, and it equals .413, which we enter against warp carding under the drill heading.

The next item is filling carding, and as this is 40 per cent. of a pound of 1.75 hank roving, we take 40 per cent. of the cost of 1 pound, or 40 per cent. of .689, which is .276, and enter this under the heading of drills, and against filling carding.

Next comes filling spinning. No. 14 yarn costs in mule room, .813 per pound, and we find but 40 per cent. of a pound of cloth, so that 40 per cent. of .813 represents the labor on filling yarn in a pound of cloth. This amounts to .325, and this amount is entered under the heading of drills.

Warp spinning for drills is the next item, and we find that 60 per cent. of the weight of the cloth is warp, that

WARPING, SLASHING AND DRAWING IN.

*Cost per pound ready for loom.*

| Kind of Cloth. | Lbs. Warped. | Wages Warping. | Wages Dressing. | Wages Drawing in. | Gen. Room Ex. | Total Wages. |
|---|---|---|---|---|---|---|
| Drills | 33,495 | $50.24 | $33.50 | $67.99 | $30.15 | $181.88 |
| Sheetings | 14,850 | 23.76 | 19.30 | 29.70 | 13.36 | 86.12 |
| Print Cloths | 9,867 | 17.76 | 11.84 | 17.76 | 8.89 | 56.25 |
| | 58,212 | $91.76 | $64.64 | $115.45 | $52.40 | $324.25 |

Drills ..... 33,495 lbs. into $181.88 equals .543 cost per lb.
Sheetings ..... 14,850 lbs. into 86 12 equals .580 cost per lb
Print Cloths ..... 9,867 lbs. into 56.25 equals .570 cost per lb

TABLE M.

WEAVING—COST PER POUND.

| Make of Cloth | Lbs. Woven. | Wages Weaver. | Gen. Room Ex. | Total Wages. | Cost per lb. | Looms Running. |
|---|---|---|---|---|---|---|
| Drills | 55,000 | $550.00 | $82.60 | $632.60 | $1.150 | 486 |
| Sheetings | 29,260 | 435.97 | 85.00 | 520.97 | 1.781 | 500 |
| Print Cloths | 17,675 | 470.15 | 84.40 | 554.55 | 3.140 | 496 |
| | 101.935 | $1,456.12 | $252 00 | $1,708 12 | $1.676 | 1,482 |

To cost of Drills ..... 1.150, add 1 per cent. equals 1.162 cost per pound.
To cost of Sheetings ..... 1.781, add 1 per cent. equals 1.798 cost per pound.
To cost of Print Cloths ..... 3.140, add 1 per cent. equals 3.171 cost per pound.

The one per cent. is added to provide against the waste, etc.

TABLE N.

the number of the yarn is 12½ and that this yarn costs .489 per pound to spin; hence 60 per cent. of this, or .293 is the cost of labor expended on warp yarn in a pound of cloth.

The next item is spooling, and we find that 60 per cent. of the cost of spooling a pound of 12½ yarn should be entered; we find the cost of spooling to be .295 per pound, hence 60 per cent. of this amount should be added to the column under drill headings. This amounts to .177.

| | Drills. | Sheetings. | Print Cloths. |
|---|---|---|---|
| Per cent. warp | 60 | 50 | 55 |
| Per cent. filling | 40 | 50 | 45 |
| Picking cost | .112 | .112 | .112 |
| Warp carding | .413 | .375 | .552 |
| Filling carding | .276 | .376 | .494 |
| Filling spinning | .325 | .619 | .799 |
| Warp spinning | .293 | .349 | .559 |
| Spooling | .177 | .201 | .292 |
| Warping, etc | .326 | .290 | .314 |
| Weaving | 1.162 | 1.798 | 3.171 |
| Cloth room | .173 | .162 | .318 |
| Total labor cost per lb | 3.257 | 4.302 | 6.611 |

TABLE O.

The next item is that of warping, slashing, and drawing in. These three items are so closely allied that no attempt has been made to separate each of the three. We find that but 60 per cent. a pound of warp is used in a pound of cloth; consequently, we take 60 per cent. of the cost of warping, slashing, and drawing in a pound of 12½ yarn (.543), which is .326.

We now come to the weaving charge, and find the cost of weaving drills, to be 1.162 cents per pound. The operation of weaving, naturally, does not distinguish the percentages of warp and filling, as both are employed, so there is no need of using the percentages we have in the previous computations. The same is true in the cost of handing the drills in the cloth room. We find the cost of drills to be .173, which is added to the column under drills.

We now add these items together as follows:

| | |
|---|---|
| Picking | .112c |
| Warp carding | .413c |
| Filling carding | .276c |
| Filling spinning | .325c |
| Warp spinning | .293c |
| Spooling | .177c |
| Warping, etc | .326c |
| Weaving | 1.162c |
| Cloth room | .173c |
| Cost per pound | 3.257c |

The cost per yard will be 3.257, divided by 2.85, as there are 2.85 yards in a pound. This gives 1.142 cents as cost of one yard of drills. The various department costs chargeable to the sheetings and print cloths are followed out in the same way, referring to the numbers of roving and yarns, and the percentages of warp and filling that apply to either kind of cloth.

In the foregoing calculations, please understand they are not actual cost statistics. The amount of wages paid in the various operations of any one department are in a measure assumed, although very close to the actual cost in our mills.

I have tried to show you how costs are figured out, leaving you to apply the principles to your individual department, and work out your own costs of your own room. And if any of you are fortunate enough to be able to obtain detailed costs of departments other than your own, you can then work out the cost of any cloth made in your mill.

All the figures we have used this evening are purely department labor costs, and include nothing charged or paid out for office, repair shops, yard and watch, or power departments. These elements are placed, as has been explained to you, generally under a general expense account, and this account naturally is made up at office of the mills, and does not come within your departments; but the mill labor cost does, and, if the principles show here and explained to you are followed out, you will be able to intelligently compare the cost of your work with that of some other overseer working on the same sizes and grades.

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—He who blows the fire runs the risk of being burned by the sparks.—Maupassant.

## Hard Fibre Baskets, Trucks and Roving Cans.

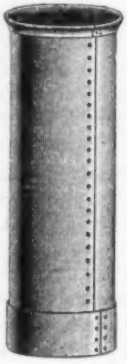
Hard fibre is a material specialty well suited for use in textile mills.

Roving cans, baskets and boxes for holding textile material in various stages of manufacture are subjected to severe usage and brought into contact with wide extremes of humidity and heat.

Hard fibre is made from especially prepared vegetable fibres, by subjecting them to the action of powerful chemicals and a vulcanizing process which, together with heavy rolling and pressing, completely changes the nature of the fibres, making of them a material different in many respects from any other known substance.

In structure, hard fibre closely resembles horn. It possesses the strength and density of a metal and yet is elastic and nearly as light as hard wood.

It is insoluble in any of the ordinary solvents and is unaffected by contact with the animal, vegetable or mineral oils. When immersed for some time in water it will absorb it and swell, but is in no way injured.



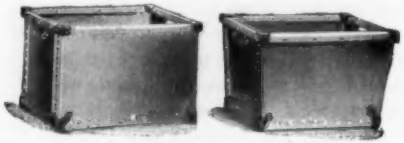
Upon drying it resumes its former size and density.

When heated it does not melt or become soft, but at a high temperature chars and loses its elasticity.

These qualities make it an excellent material for roving cans and mill baskets, which should combine lightness with durability.

The Diamond State Fibre Co., Elsmere, Del., manufacturers of hard fibre articles make a wide variety of mill baskets from this material.

Our illustrations show one form, mounted on wheels, which is well adapted for wool, yarn or cloth. A lighter basket is also shown, which is provided with wooden shoes when required. Special sizes and shapes are made to order. Many of these baskets are now in constant use, and giving excellent satisfaction. The roving cans made from this hard fibre have been thoroughly tested and have given great satisfaction, and we understand that their durability can be still further increased by providing them with steel bottoms and tops, which the Diamond State Fibre Co. provide when so specified.



In addition to baskets and roving cans hard fibre is made into a large number of articles, such as noiseless gears, journal bearings, loom rollers, spool heads, pickers, shuttles, etc. Further information may be obtained by addressing the manufacturers.

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—It is love that inspires us to great deeds and prevents us from accomplishing them.—Dumas fils.

—The young live in the future, the old in the past, and the wise in the present.—Thevenot.

## The Action of Caustic Soda on Wool.

*Thesis by C. Earle Washburn.*

(Continued from July.)

These experiments were made under the following conditions:

Strength of bath.....5 deg. Tw.
Temperature .....Ordinary.
Time .....5 m.

It is to be understood that in all of the following experiments the yarn was lifted from the caustic soda solution. It was first washed thoroughly in water, then run through a bath of 1 per cent. solution of sulphuric acid, and then again washed in water and dried before the tests were made.

### EXPERIMENT NO. 1.

Conditions: Strength of bath, 5 deg. Tw.; Temperature, ordinary; time, 5 m.
Results: 38.5 lbs.; 40; 38.5; 40.5; 38.5; 42; 37.5; 39.5; 40 and 38 lbs.

Taking an average of the above results, we have 39.4 lbs. for the tensile strength of the yarn under the above conditions. The yarn had not changed in appearance at this point, but had decreased 1.5 lbs. in tensile strength. It will be seen that even at this slight concentration of bath, the fibre was injured.

### EXPERIMENT NO. 2.

Conditions: Strength of bath, 25 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 28.5; 26; 28; 26; 28.5; 28.5; 29; 26; 28.5; 29. Average 27.8 lbs.

The tensile strength it will be noted has decreased 13.5 lbs. from the original. The yarn had a yellow appearance, was very harsh and brittle and was greatly felted.

### EXPERIMENT NO. 3.

Conditions: Strength of bath, 35 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: The yarn at this concentration was entirely dissolved, imparting a yellow color to the bath. At this point it was observed that the caustic soda had the strongest and most injurious action. HCl was added to the bath and the wool was precipitated as a yellow, slimy mass.

### EXPERIMENT NO. 4.

Conditions: Strength of bath, 40 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: The yarn at this point was greatly disintegrated and had the appearance of a transparent, slimy mass, and the tensile strength was not determined. The action of the caustic soda at this point, however, was not as injurious as in the preceding experiment.

### EXPERIMENT NO. 5.

Conditions: Strength of bath, 60 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 25.5; 24.5; 26.5; 25; 24; 26; 26.5; 25; 24.5 and 25. Average, 25.3.

The yarn was very much felted; had a yellow appearance and was very brittle and weak. When the yarn was wet it could be drawn out to nearly twice its original length, or in other words, was very elastic.

### EXPERIMENT NO. 6.

Conditions: Strength of bath, 70 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 29.5; 31.5; 30; 31; 32; 28; 30 and 30.5. Average, 30.5.

The yarn had the same appearance as in the previous experiment and was very much felted.

### EXPERIMENT NO. 7.

Conditions: Strength of bath, 75 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 39.5; 39; 40; 41; 40.5; 39.5; 39; 40; 41 and 40.5. Average, 39.5.

It will be noticed that at this point of concentration, the yarn had nearly gained its original tensile strength. It had a high lustre and a silky feel, and in general had improved greatly over the previous experiment.

### EXPERIMENT NO. 8.

Conditions: Strength of bath, 80 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 54.5; 54; 53.5; 53; 54.5; 54.5; 55; 55.5; 53; 53.5. Average, 54.5.

The yarn had a very high lustre, a silky feel and also had a rustle similar to silk: was not harsh or brittle, and was perfectly white.

### EXPERIMENT NO. 9.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 55.5; 55; 56; 56.5; 54.5; 54.5; 55; 56; 56; 55. Average, 55.5.

The yarn had the same appearance as in the previous experiment, but had slightly increased in strength.

### EXPERIMENT NO. 10.

Conditions: Strength of bath, 85 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 51; 52; 51.5; 53; 52.5; 53.5; 51; 51; 53; 53.5. Average, 52.4.

Appearance unchanged, but the tensile strength had decreased.

### EXPERIMENT NO. 11.

Conditions: Strength of bath, 90 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 47; 47.5; 46; 46.5; 47; 48; 47.5; 46; 47 and 48. Average, 46.5.

Appearance unchanged, but the tensile strength had greatly decreased.

### EXPERIMENT NO. 12.

Conditions: Strength of bath, 100 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 38.5; 37; 37.5; 36.5; 36; 38; 36; 38.5; 36.5; 37. Average, 37.

The yarn at the above concentration had begun to have a yellow color, and become brittle and harsh. So it was not deemed necessary to carry out the investigation any further, as far as the strength of bath was concerned.

From the foregoing experiments it was found that the yarn had the greatest tensile strength at 82 deg. Tw. Also at this point the yarn had the best appearance. Thus having found the best concentration of bath, we now proceed to find at what length of time the yarn will be found to have the greatest tensile strength in a bath at 82 deg. Tw. The following experiments were carried out.

EXPERIMENT NO. 13.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 5 m.
Results: 55.5; 56.5; 57; 56.5; 57; 56.5; 57; 56.5; 57 and 57.5 lbs. The average being 56.5.

EXPERIMENT NO. 14.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 10 m.
Results: 54.5; 55.5; 56; 55.5; 55.5; 55; 56.5; 56; 56.5 and 56 lbs. Average, 55.5.
It will be noticed that there was a decrease of 1 lb. from the previous experiment.

EXPERIMENT NO. 15.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 15 m.
Results: 49.5; 52; 51.5; 53.5; 50; 51; 49; 48; 51 and 52 lbs. Average, 50.5.
Although the yarn had decreased in tensile strength, its appearance had not changed.

EXPERIMENT NO. 16.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 30 m.
Results: 46.5; 48; 48.5; 46.5; 47.5; 47; 47; 48.5, 46.5 and 47 lbs. Average, 47.
The tensile strength continued to decrease and the yarn had a yellow color, was slightly felted and harsh.

EXPERIMENT NO. 17.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, ordinary; Time, 60 m.
Results: 28.5; 28; 31; 30.5; 30; 28.5; 30; 31; 30.5 and 30. Average, 29.5.
The yarn had a permanent yellow color, was felted greatly and was brittle and harsh. Thus it will be seen that when the yarn had remained in the caustic soda bath for 5 m. it had acquired the greatest tensile strength.
Having determined the best strength of bath, and period of steeping, we proceeded to find the best temperature.

EXPERIMENT NO. 18.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 100 deg. C.; Time, 5 m.
Result: At this temperature the yarn was entirely dissolved.

EXPERIMENT NO. 19.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 60 deg. C.; Time, 5 m.
Result: The yarn was dissolved as in the previous experiment.

EXPERIMENT NO. 20.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 30 deg. C.; Time, 5 m.
Results: 35.5; 35.5; 33.5; 33.5; 34; 34; 33.5; 33.5; 35.5; 35.5. Average, 34 lbs.
The yarn was very harsh and brittle.

EXPERIMENT NO. 21.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 20 deg. C.; Time, 5 m.
Results: 55.5; 55; 55; 55.5; 56; 56; 55; 55.5; 55. Average, 55.5.
The yarn at this temperature had a very high lustre, a silky feel and a rustle when pressed.

EXPERIMENT NO. 22.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 15 deg. C.; Time, 5 m.
Results: 56.5; 56; 56; 56.5; 57; 57; 56; 56.5; 56.5; 56. Average, 56.5 lbs.
The yarn at this temperature had the greatest tensile strength, was very lustrous, had a rustle like silk and was very white.

EXPERIMENT NO. 23.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 10 deg. C.; Time, 5 m.
Results: 52; 52; 50; 50; 53.5; 53; 50.5; 50; 52.5; 50.5. Average, 51.5.
By comparing the two preceding experiments it will be seen that the yarn is decreasing in strength.

EXPERIMENT NO. 24.

Conditions: Strength of bath, 82 deg. Tw.; Temperature, 0 deg. C.; Time, 5 m.
Results: 50.5; 49.5; 49; 49.5; 49; 50; 49.5; 49; 49.5 and 50. Average, 49.5.

We thus found that the yarn had the greatest tensile strength, was most lustrous, and was the best in all respects when treated at 15 deg. C in a bath standing at 82 deg. Tw. for a period of five minutes.

The above series of experiments were made with 2/36 yarn. We proceeded to experiment with other grades and sizes of yarn to see if the same is true of all fibres. Below in the first column is given the original strength of 40 strands of yarn, and in the second column the tensile strength of the same yarn after treated with caustic soda under the best conditions as above determined.

| Original | After treated |
|---|---|
| 25.5 lbs. | 32 lbs. |
| 29 " | 39.5 " |
| 30.5 " | 41 " |
| 42 " | 57 " |
| 50 " | 65.5 " |
| 54.5 " | 74 " |

From the above results it will be seen that the action of caustic soda under the best conditions is true of all kinds of woolen and worsted yarns.

In all of the previous investigations it was found that the yarn would not be freed entirely from the caustic soda by merely washing with water. Even after boiling, traces of caustic soda were found and after drying the yarn was very stiff and brittle. It was found necessary to entirely remove all traces of Na OH, and to this end the yarn was treated in a weak acid bath. The following experiments were made.

After raising from the caustic soda bath the yarn was washed thoroughly

in warm water, then quickly run through a bath of a 1 per cent. solution of nitric acid and then again washed in water. The yarn was left in a lustrous condition, but had a yellow tint. The above experiment was repeated, only using a 1 per cent. solution of hydrochloric acid instead of the nitric, but the yarn again had a yellow tint. Using sulphuric acid in place of hydrochloric, the result was different. After first washing in water as before the yarn was run through a bath containing 1 per cent. sulphuric acid; the yarn as soon as it was immersed in the above acid became a pure white with the evolution of hydrogen sulphide, which showed that there was a loss of the sulphur in the wool. A discussion of the above fact will be made later on. Of the three acids used for an after wash, sulphuric acid was found to be the best because it left the yarn colorless.

Ammonia was used in place of acid and was found to give very good results, but a much longer time for washing was required. The ammonia made the caustic soda more soluble and it was thus more easily removed. It will be noted that no salts are formed between the caustic soda and the ammonia, but when sulphuric acid was used sodium sulphate was formed on the fibre, which, in dyeing would be of advantage. The choice in the selection of sulphuric acid over ammonia lies in the fact that much time is saved, although in the end the yarn was left in the same condition by both, as far as physical properties were concerned.

Yarn that was treated in the manner described above with sulphuric acid had a high lustre, a soft silky feel, and when rubbed together had a rustle similar to silk, and was not matted or felted. Yarn which was not treated with an acid or ammonia wash was found to quickly disintegrate after drying, and become harsh and brittle. Therefore the above after wash is necessary for the success of the caustic soda process of treating wool.

### AFFINITY FOR DYE-STUFFS.

From samples prepared it was seen that the yarn treated with caustic soda had a much greater affinity for dyes than the untreated yarn. Experiments were made with acid, basic, mordant, substantive and natural dyes. The greatest increase in affinity for dyestuffs appears to be with indigo, and the least with basic dyes as a class.

A few experiments were made in order to estimate the comparative absorbent powers of the treated and untreated yarns, and also the time that could be saved in dyeing. The results of the different experiments follow.

### SUBSTANTIVE DYES.

A skein of treated and one of untreated yarn were placed in a bath containing ½ per cent. of dye-stuff, and 20 per cent. salt. After 10 minutes the treated skein was taken out and it was found that it required ¼ per cent. more dyestuff to bring the untreated skein up to the same shade after having been in the bath 10 minutes longer. From the foregoing experiment we see that ¼ per cent. of dyestuff was saved and 50 per cent. of time with substantive dyes.

Mordant Dyes: Dyestuff saved ⅛ per cent.; time saved 40 per cent.

Basic Dyes: Dyestuff saved ⅛ per cent.: time saved 10 per cent.

Acid Dyes: Dyestuff saved ⅛ per cent.; time saved 30 per cent.

### THEORY AS TO "THE CHEMICAL CHANGE."

An analysis of the wool fibre according to Hummel is as follows:

| | |
|---|---|
| Carbon ..... | 49.25 per cent. |
| Nitrogen ..... | 15.86 per cent. |
| Hydrogen ..... | 7.57 per cent. |
| Sulphur ..... | 3.66 per cent. |
| Oxygen ..... | 23.66 per cent. |
| | 100.00 |

It has long been known that the presence of sulphur is characteristic

of wool, and often causes difficulties in mordanting and dyeing. Numerous methods have been suggested for removing the sulphur from the fibre, but many authorities claim that as the sulphur is abstracted the tensile strength grows less.

In experimenting with worsted and woolen yarn treated with caustic-soda under the best conditions, observations were made which led us to determine whether or not the treated fibre had lost part or all of its sulphur. Lead acetate was added to solution of caustic soda at 82 deg. Tw. and 15 deg. C in which no yarn had been treated, and there took place no characteristic reaction. A skein of yarn was immersed in the caustic soda for 5 minutes, and then raised; the lead acetate was now added to the bath when a black precipitate of lead sulphide was formed. This was a qualitative test to see if any sulphur had been given up by the wool. Again, when the treated skein was passed through the acid bath, an evolution of $H_2S$ was noticed showing that sulphur was being liberated, and as there was no sulphur present in any of the chemicals used that could be liberated in this manner, it is to be presumed that it came from the wool fibre.

A quantitative analysis of the sulphur contents of both the treated and untreated wool was made.

PROCESS.

A skein of yarn weighing about 3.5 grams, being thoroughly scoured and washed, was dissolved by heating in a solution of caustic soda at 82 deg. Tw. in the presence of bromine water. When solution was complete the solution was neutralized with hydrochloric acid, after standing for about 10 m. the solution was filtered and the precipitate thoroughly washed until the drainings showed no presence of sulphates. To the filtrate was added barium chloride; this solution was filtered, the precipitate, which consisted of barium sulphate, was washed, ignited and weighed.

RESULT OF ANALYSIS OF UNTREATED YARN.

Wt. of yarn taken 4.0063 gms.

Wt. of $BaSO_4$ found .9975 gms. (Equivalent to 3.42 per cent. of sulphur).

RESULT OF ANALYSIS OF TREATED YARN.

Wt. of yarn taken 3.7554 gms.

Wt. of $BaSO_4$ found .0195 gms. (Equivalent to 0.53 per cent. of sulphur).

Thus 84.45 per cent. of sulphur had been lost by treating the yarn with caustic soda. It has already been shown that the tensile strength was greatly increased by the above treatment with caustic soda. From these observations and results it has been shown that even after the sulphur has been removed the fibre had been greatly increased in tensile strength. It is claimed by some authorities that the presence of sulphur in wool is detrimental to its dyeing properties and its affinity for dyestuffs. Here it has been shown that wool treated with caustic soda has a much greater affinity for dyestuffs and hence we presume this latter property is due to the loss of sulphur.

In determining the best temperature it was found that when the bath was cooled to 5 deg. C the caustic soda began to separate, thus reducing the strength of the bath about 5 deg. Tw. Also at 0 deg. C it had fallen about 8 deg. Tw. This explains the fact that the yarn at these two temperatures (5 deg. and 0 deg. C) had begun to lose in strength. If it was possible to maintain a strength of 82 deg. Tw. at 0 deg. no doubt the tensile strength would have been increased even more than at 15 deg. C.

In order to obtain the best results and to assure even dyeing, it is necessary that the yarn be thoroughly scoured and wet out before working in the caustic soda bath. It was found that when five 5 gram skeins were worked in the caustic soda solution for 5 minutes that the bath had decreased 2.5 deg. in strength so when

large amounts of yarn are to be treated it will be found necessary to add caustic soda after each treatment until the bath stands at 82 deg. Tw. On the other hand, if the yarn was immersed in the bath in the dry condition, no depreciation in strength is noticed; so the decrease in strength was due to the bath taking up the water from the previously wet out skeins.

"TREATMENT WITH GLYCERINE."

When glycerine was added to the bath the weakening action of the caustic soda was reduced. Caustic soda standing at 82 deg. Tw. when mixed with an equal quantity of glycerine gave in 5 minutes woolen yarn breaking under a strain of 63.5 lbs.; in 10 minutes 61 lbs; in 30 minutes 55.5 lbs. and in 60 minutes 43 pounds.

The addition of glycerine to more dilute baths was likewise effective, causing the wool to be less energetically effected.

FORMALDEHYDE.

An experiment was made with formaldehyde to see if its combined action with caustic soda would increase the tensile strength of the fibre, but it was found that wool breaking under a strain of 43.5 lbs. when treated with the above in equal proportions, broke under a strain of 39.8 lbs.

ADVANTAGES OF THE PROCESS.

In these days when competition counts for so much in the success of the various textile industries, any saving of time and materials is a great advantage. As has been shown the action of caustic soda is the same on all grades and sizes of woolen and worsted yarns. Supposing that a manufacturer had made a contract for a certain grade at a set price, and after the contract had been made the stock that he was to use in making the goods raised in price; he could take a poorer grade of yarn of the same size, treat it with caustic soda and increase its tensile strength, and at the same time bring its lustre up to the standard of the original yarn to be used. By this treatment it will be readily seen that he could save money. The yarn so treated could also be dyed more cheaply.

COLOR EFFECTS.

Various color effects can be made by weaving the treated and untreated yarn together in the same fabric in suitable patterns and then dyeing, the treated yarn showing up much darker. Here a great deal of time would be saved, as it has been shown that yarn can be treated with caustic soda much quicker than it can be dyed, so by weaving the treated and untreated yarns together, and then dyeing them is much sooner accomp'ished than dyeing two lots of yarn and then weaving.

PRINTING.

The caustic soda process is also made use of in printing. A paste of the caustic soda solution and gum tragacanth is made and printed on the cloth; after dyeing the parts of the cloth upon which the caustic soda has been printed, will appear darker than the untreated. The above was tried by actual experiment and found to work very well.

ELASTICITY.

The elasticity of the fibre was found to increase in direct proportion to the increase of tensile strength e. g. at 82 deg. Tw. the yarn had increased in elasticity to about 62½ per cent., while in the untreated wool it was only 35 per cent.

METHOD OF MANIPULATING.

The process of treating woolen or worsted yarn with caustic soda requires 3 different baths, whether the process is carried out by hand or by machinery. In case the ordinary dye kettles are used, the ones which contain the soda and acid should be lined with copper. The one containing the water of course would be the same as any ordinary dye kettle. The yarn

should be completely immersed in the caustic soda, so that it would be necessary for the person while working the yarn to wear rubber gloves.

A machine for carrying out the process is as follows:—It should consist of three compartments. The first containing the caustic soda, of regulation width and depth, should be copper lined. The next adjoining compartment containing lukewarm water, should be of the same size as the first and be built of iron or wood. Between the first and second compartments there should be a squeeze roll so as to remove as much of the caustic as possible before being passed into the water. The third compartment should be copper lined, as was the first, and contain the acid wash. After passing from the acid bath, the yarn could be either washed by hand, or it could be passed into a fourth compartment. The skeins of yarn should be linked together so as to form a continuous chain. The speed of the machine should be so regulated that it would take the yarn exactly 5 minutes to pass through the caustic soda bath. In the above machine the entire process would require about 20 minutes.

GENERAL FORMULA.

The material to be treated should be thoroughly scoured and wet out, then passed into the caustic soda bath at 82 deg. Tw. for five minutes at 15 deg. C. Raise, squeeze and wash for five minutes in lukewarm water; pass through a bath of 1 per cent. sulphuric acid; wash again in water and dry or dye in the usual manner.

In conclusion we can say that the tensile strength of the wool has increased, has a greater affinity for dyestuffs, a better lustre, and in all ways is superior to the untreated material.

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—Life holds us suspended by the golden thread of hope. When the gold is exhausted, there remains but the thread which strangles us.—Lucenay.

## The Houghton Metal Thread Board and Guide.

Since this device was illustrated and described in the columns of the Textile World several months ago it has been put in on trial in a number of prominent cotton mills; the returns are beginning to come in and bear out in a gratifying manner the claims and expectations of the manufacturers. The overseers in whose rooms the metal thread boards have been tried seem to be unanimous in commending it and consider it a great improvement over the old style board, as it is so easily kept clean and the guide wires are held exactly in place.

It is in small things like these that economies of a room are made. When it is considered that the expense of the metal thread board is only a trifle more than the old fashioned wood board, it would seem to be especially to the advantage of mills ordering new frames to specify that the metal thread board should be put on. Machine builders furnish them when specified. The life of the board is very much greater and its advantages are clearly apparent if anyone takes the trouble to ascertain for himself. The manufacturers, L. T. Houghton & Sons, Worcester, Mass., are pleased to send a sample of the board upon receipt of 15 cents for postage.

The following letters from practical mill men are a few of those received from mills which have tried the device.

Williamstown Mfg. Co. Williamstown Station, Mass.

Mr. L. T. Houghton, Worcester, Mass.

Dear Sir:—The section of thread board came all right. We put it on frame and it makes a good job. All builders of spinning frames should use them as they are certainly the best in every particular ever made and I wish you the success you deserve. When we order new frames, I shall certainly have them on. It is the only practical thread board and guide I ever saw.

(Signed) Roland R. Kelly, Supt.
Williamstown Mfg. Co.

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Uxbridge Cotton Mills.
Uxbridge, Mass., June 19, 1901

Mr. L. T. Houghton.

Dear Sir:—I have used your thread board on one frame for two months and consider it a great improvement over

the old style board. It is easily kept clean and guide wires held exactly in place. If I were putting in more new frames today, I should consider your thread board an additional value to them. Yours truly,

(Signed) F. B. Whitin, Agt.

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Linwood, Mass., June 27, 1901.

L. T. Houghton, Esq., Worcester, Mass.

Dear Sir:—I have given your thread board a thorough and impartial trial, and I unhesitatingly state that it is a very superior thread board in every point of view. The adjustable thread guide is very simple, yet very effective, as it cannot be disarranged or changed by the operator when set. The general make-up of the thread board is superior and much more durable than any thread board I ever used, and will last a life time. Wishing you success, which you certainly merit for giving the world a better thread board than it ever had previous to the introduction of your new thread board, I am,

Yours very truly,

(Signed) William Spencer.

Overseer Ring Spinning at the Linwood Mill.

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## Memoirs of a Veteran Wool Carder.

### III.

(Continued from July.)

The filling stock used for these linsey woolseys and carpets was composed of jute bags and cotton hard ends, first run through a cotton rag picker and then through a card. The business proved a failure, and I was compelled to take my pay in linsey woolsey carpets.

I next engaged with Joseph Townsend, Superintendent of the East Wilton Mills, East Wilton, Me., as carder and spinner. John Clark of Boston was the owner of the mill. The cards were equipped with the old tube condensers. It is doubtful if this style of condenser is in use at the present time. Occasionally they can be found among the rubbish in the garret of some old woolen mill. With these tube condensers it was necessary to stop the finisher every time an end broke.

I worked at the East Wilton Mills fifteen months and then secured a position with Amos Brown & Co., Chicago, Ill. They were Western agents of mill machinery. I worked for them two years setting up and clothing cards in Western mills. Most of these mills were small, having one or two sets of cards each, and were widely separated from each other so that I was compelled to travel a great deal through the South and West. It was a valuable experience for me, and many interesting and amusing incidents occurred of which I will mention two.

George Wilmot had removed his one set of carding and spinning machinery from Janesville, Wis., to Boone, Iowa. I was sent to set the machinery up. When I reached the mill they had the cards set up and clothed, but had put the clothing on with the wire pointing in the wrong direction. After straightening this matter out I received a dispatch to go to Warrensburg, Mo., that the mill there was in trouble. Upon reaching this mill I found that they had been running two sets of roll cards for some years and had recently put in one set of Davis & Furber carding and spinning. The mill was located in the centre of the town in a building that had formerly been used as a store. Before I arrived the roll carder had set up the new cards and had stock running through the first and second breaker all right. The new machinery had excited great interest throughout the town, and about all the business men of the town were waiting around the mill to see the new card start. When they came to start the finisher, however, the stock would not come through the rub rolls. The carder stated that he had examined similar cards in other places and found that their condensers were set the same as his own. At my request he started the card, but the roping did not come through the rub rolls. It was a puzzle to me for a few minutes until I examined the gears which drove the rolls. I found that the condenser had been placed in the frame hind side before, bringing the small gears next to the doffer. This resulted in each roll running slower than the preceding one and, of course, in clogging up the condenser. I reversed the gears and the work came through all right. In less

than an hour over one hundred people came in to see it. One man stood at the door, yelling like mad, "He's got it going! He's got it going!" Schmidlapp, Garmo & Co. were operating the mill at that time.

After traveling for this Western firm for two years, I went to work for the Knoxhill Company, Warsaw, Ill., and at the end of six months returned to the East, commencing work with B. B. Farnsworth, Lisbon Plains, Me. Here I met with a great misfortune. My little boy Willie, four years old, fell into the mill dam and was drowned. My next position was with John Hall, Agent of the Cocheco Woolen Co., East Rochester, N. H. E. M. Sinclair, the present agent, and W. Faunce were then boss weavers. W. Hedrick was boss spinner, Chas. Parker, dyer, and Mr. Faunce, finisher.

It was here that I first used the Apperley feeds in place of the old creels. This was my first large mill. There were sixteen sets of cards, and after we got the Apperley feeds running on one set of cards, Mr. Hall was so well pleased with them that he had the feeds put on the whole sixteen sets.

John Hall was a very pleasant man. Very often he could be seen on pleasant mornings walking from the lower mill on the canal bank. He would come into the card room, his ruddy and pleasant countenance beaming with good nature, and say, "Sam, Oh, it is splendid outside this morning; Go out and take a walk." I never accepted these kind invitations for I was too much interested in the work inside of the mill, but the offer did me a great deal of good; it made me feel that I could work all day and all night for such a man. Mr. Hall was a shrewd manufacturer and always ready to adopt improvements in machinery and processes.

This was before the advent of the Bramwell feed. We had a Bolette first breaker feed on trial, but it was not satisfactory. The Apperley feeds proved a very good thing for us, as help was scarce. While at this mill there was a smallpox scare in the town and both of my second hands became very much frightened and vaccinated themselves with the virus from some of the other boys. Jo vaccinated both arms and Eli both legs; the consequence was that both were laid up for three weeks, leaving me without any second hand during that time. It was here that I made the acquaintance of George S. Harwood, who with Mr. Quincy, his partner, were struggling to introduce the Apperley feed. This machine met with very strong opposition, but they succeeded in introducing it as well as the Bramwell feed, which they took up later. They were both hard workers. My friendship with them was lasting, but both are now laid low. I stayed here five years. During that time Mr. Hall resigned and Charles Whitehouse of Gonic succeeded him as agent. S. B. Rindge, head of the firm of Parker, Wilder & Co., Boston, visited the mill once a year; he was a fine man and never forgot to call on me in the card room. He always had a cheery "Good morning," which has left a lasting impression on my mind. I left this mill in December, 1875, and with my family set sail on a visit to England, the 1st of January, 1876. SAM DRIVER.

(To be continued.)

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—A loom for weaving woolen dry felts used in paper making has recently been built in England which the builders claim is the largest loom in the world. It has a reed space of 29 feet. The total length is 37 feet. The weight without warp being 20 tons. A special mechanism causes the lay to dwell when drawn back, thus giving the shuttle time to pass over the long distances from one end of the loom to the other.

—To be silent and let your silence be understood is the eloquence for situations of difficulty.—Lamartine.

—If we cannot perceive the faults of those we love, how can we realize our own?—Coeuilhe.

# COTTON DEPARTMENT.

The TEXTILE WORLD asks practical men to contribute articles for this department. We pay for articles accepted. The acceptance depends entirely upon the value of the ideas expressed. We make all necessary revisions, and urge practical men to contribute, regardless of experience in writing for publication. Illustrations add much to the value of an article, and photographs and sketches are desirable. All communications are confidential, and under no consideration is writer's name published or made known without his permission.

## American Cotton Spinning Machinery.

ARTICLE XVIII.

*CHARLES CLIFTON HEDRICK.*

(Copyright.)

The successful working of the comb depends almost wholly upon the timing and setting of the various parts so that one movement will follow another at the proper time. These can be varied, slightly, according to the length and quality of the cotton being used and the judgment of the one in charge of such work. The following are average timings and settings.

To set the cylinders: Turn the cylinder shaft around until number 5 on the timing dial comes beneath the index finger, then set the front edge of the fluted segment from the flutes of the steel detaching roll with 1⅛ inch gauge and tighten the cylinders on the shaft.

To set the feed roll: Use 1 15/16 inch gauge between the flutes of the steel detaching roll and flutes of the feed roll; tighten feed roll slides into place.

To set the cushion plates to the nipper knives: Put the cushion plate in place and set it up against the nipper knife with one thickness of ordinary writing paper between at each end. Press the nipper firmly against the cushion plate and see that each piece of paper is held securely. This sets the cushion plate parallel with the nipper knife.

To set the cushion plates from the steel detaching roll: Use 1¼ inch gauge between the lip of the plate and the flutes of the detaching roll.

To set the nipper knives from the fluted segments: First disconnect the upright rods and use number 20 gauge between the edge of the nipper knife and segment. The nipper stop screw must project through the arm about one-quarter of an inch and a ¼ inch gauge must be placed between the point of the screw and the nipper stand. After setting the right-hand screw, remove the gauge and bring the left-hand screw up against the nipper stand. Next put a strip of writing paper between the point of each screw and stand, and see that it draws with the same tension from each. The cylinder shaft should now be turned around until number 17 on the dial is under the pointer; the cam roll will then be on the largest diameter of the nipper cam. Put on the right hand connecting rod and spring; try ¼ inch gauge between the nipper screw and stand, and adjust the nuts on the connecting rod until the gauge will draw out with ease. After this put on the left-hand rod and spring and have the gauge draw out with the same tension. Turn the cam back to the first position and try number 20 gauge between the nipper knife and the half-lap, and see that everything is free.

To set the leather detaching rolls: Turn the cylinder shaft around until the dial is at 6¾, then put the rolls in position with the end bushings on and attach weights. Let the rolls rest against the fluted segment. Use number 23 gauge between the lifter-block and bushing of roll. Set the right-hand side of one roll first; then turn the detaching roll cam around so as to bring the block up against the gauge. Next try the gauge between all of the other blocks and bushings and set the blocks up so that the

gauge will draw from each with the same tension and tighten blocks in place. Put a strip of writing paper between the fluted segment and the leather detaching rolls at each end and adjust cam lever so that the rolls will touch the segments at 6¾.

To time the nippers: Turn the cylinder shaft around until 9¼ comes under the pointer. Loosen the nipper cam and turn it around until the nipper stop screws leave the stands at 9¼, then make nipper cam fast on the shaft.

To set top comb to leather detaching rolls: Remove the end bushings from the leather roll and put 1/32 inch gauge between it and the steel roll and have it touch, lightly, against the top comb, which should be inclined about thirty degrees, then remove the gauge from between the rolls and see that the leather roll is free from the comb.

To set the top combs to fluted segments: Use number 20 gauge between the points of the comb needles and the segment. Set the comb by the stop screws with a strip of paper under each, which should draw out with the same tension. Loosen the top comb eccentric and turn it around until the throw is downward and wedge the eccentric arm in place. Turn all the stop screws against the top comb arms and set each with a strip of paper. After setting all the combs, turn the dial around to number five and set the top comb eccentric so that a strip of paper will not draw from between the stop screw and stand.

To time the feed roll: Turn the cylinder shaft around until the dial shows 4½ under the pointer, then set the pin so that the feed roll will start forward.

To time the detaching rolls: Turn the cylinder shaft around until the dial is at 6; then set the detaching roll cam so that the rolls will start to turn forward. The brass top rolls should be set from the leather rolls with number 21 gauge and their flutes should be in mesh with the flutes of the steel roll.

Owing to the naturally irregular disposition of cotton fibres, it is impossible to remove the waste without removing more or less long fibres, nor can the percentage of waste be known until after the cotton has been combed, as some varieties are much cleaner than others and contain fewer short fibres. The waste is often increased by the faulty setting and timing of the parts.

There are various ways of controlling the amount of waste. In the top comb, the dropping varies from 4½ to 6½. If dropped at 4½, more waste is combed out, as the comb needles enter the lap before it is drawn forward by the detaching rolls, while if dropped at 6½, they do not enter the lap until after it has started, consequently some of the fibres escape combing.

The angle of the top comb and the distance from the fluted segment also control the amount of waste. The comb needles, which act as hooks, upon which the fibres are caught, enter the lap at nearly right angles to the direction that it is drawn. Now it is evident, that the more acute this angle the greater is the retaining power, so more waste will be removed. The nearer the needles are allowed to approach the fluted segment, the more they penetrate the mass of cotton, thus giving it a more thorough combing.

The time of starting the feed roll varies from 4 to 6; if started at six, more waste will be made than if started at 4, as the later the feed roll starts, the more the lap is liable to curl and not pass freely between the nipper and the cushion plate. Curling causes the lap to bunch in places and when these are acted upon by the cylinder needles, more of the long fibres are combed out than would be the case if the lap were perfectly smooth and even.

The closing of the nippers takes place from 9 to 10. If closed at 10 more waste is made than at 9. The reason for this is very apparent. If the nipper does not close until the comb needles have commenced to work, the cotton will be drawn from

between the nipper and cushion plate. This late closing, as it is called, should be avoided, as many of the long fibres will be combed out with the waste, which would otherwise be carried forward with the sliver.

The leather detaching roll is brought into contact with the fluted segment at 6¾. If brought into contact before 6¾, more waste is made.

The length of time that the leather detaching roll is allowed to remain in contact with the fluted segment also controls the waste. A number 25 gauge, used between the lifter blocks and the bushings of the leather roll, will give more waste than a number 21 gauge, as it is thinner and allows

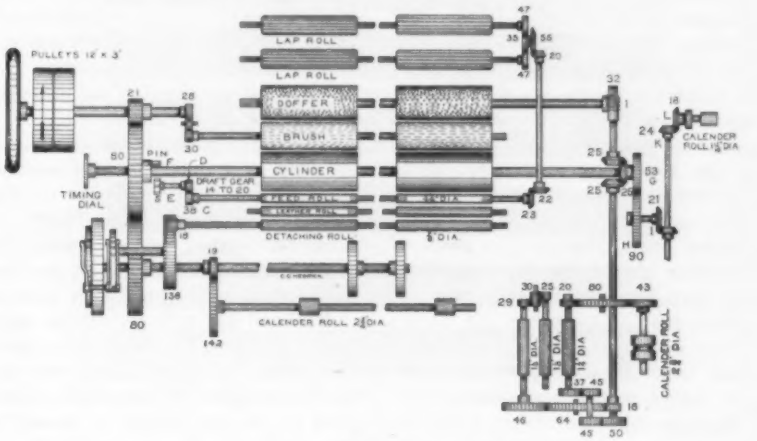



FIG. 116.

the leather roll to remain in contact with the fluted segment longer.

The leather detaching roll starts to turn forward at 6¼. If started before this, more waste is made than if started after, as the forward rotary movement of the roll together with the rotary movement of the fluted segment detaches the cotton from between the nipper and the cushion plate, and, if this movement commences before the nipper is open sufficiently to allow the cotton to be drawn forward, the fibres are broken.

In order to work out the various calculations, a diagram of the comber gearing is given in Figure 116. The usual speed of the driving pulleys, which are twelve inches in diameter by three inches face, is about 300 R. per minute. On the outer end of the driving shaft is a heavy balance wheel, which serves a double purpose, namely, to enable the cylinders to be turned readily when setting the various parts and to prevent any fluctuation in the speed of the comb, as the cylinder shaft turns much harder while the needles are passing through the cotton than at any other time. Were it not for this balance wheel, the comb would run with considerable vibration, which tends to loosen the screws and bolts, as well as to disturb the settings.

On the inside end of the driving shaft is a gear of twenty-one teeth, in gear with one of eighty teeth which is fast on the cylinder shaft. The speed of the cylinders is therefore about seventy-eight revolutions or nips per minute.

The feed roll, which is three-quarters of an inch in diameter, is driven from the cylinder shaft by a pin and a star wheel having five teeth. On the same stud as the star-wheel is the change or draft gear, of from fourteen to twenty teeth, by which the feed is regulated.

The calender rolls, in front of the cylinders, are driven from the cylinder

shaft by a gear of eighty teeth which drives a similar gear of the same number of teeth. On the shaft of the latter is another gear of nineteen teeth, which drives one of one hundred forty-two teeth, which is upon the calender roll shaft.

The draft rolls are driven from the foot end of the cylinder shaft by a gear of twenty-five teeth, which drives another of twenty-five teeth. On this same shaft are two gears, one of sixteen teeth, which drives the back roll through an intermediate of sixty-four teeth, and one of forty-six teeth, which is upon the back roll.

The front roll is driven from the gear of fifty teeth, through the double intermediate of forty-five teeth and the gear of thirty-seven teeth. The calender roll, in front of the draft rolls, is driven from the other end of the front roll by the gears of twenty, eighty and forty-three teeth. The middle roll is driven from the back roll by the gears of twenty-nine, thirty and twenty-five teeth.

The coiler is also driven from the cylinder shaft, through the gears of fifty-three, ninety, twenty-one and sixteen teeth, the last being upon the upright shaft in the coiler. At the top of this shaft is a gear of twenty-four teeth, driving an eighteen toothed gear, which is upon the calender roll.

The lap rolls are driven from the feed roll by the gears of twenty-three, twenty-two, twenty, fifty-five, thirty-five and forty-seven teeth. The first and last mentioned are upon the feed roll and lap roll respectively, and, as the motion of the feed roll is intermittent, the lap rolls receive a corresponding movement.

The doffer is driven by a single worm and a worm gear of thirty-two teeth and a bevel gear of twenty-five teeth, from the same gear which drives the draft rolls. The brush and doffer comb are driven from the driving shaft, the brush by the gears of twenty-eight, thirty-five and thirty teeth and the comb by a connecting rod, one end of which is fastened to an arm on the cam shaft and the other working on a pin set eccentrically in the face of the twenty-eight toothed gear, on the driving shaft. The eccentric setting of the pin gives the oscillating motion to the comb.

The production of the comb is governed by the weight of the laps per yard, the number of revolutions that the cylinder makes per minute, the draft of the comb and the per cent. of waste. A glance at the diagram of the gearing will show that the calender rolls in the coiler are the last through which the sliver passes, and the length delivered by them at each revolution of the cylinder should be taken into account in figuring the production. These rolls are 1 11/16 inches in diameter and make 1.03 revolutions to one of the cylinder, which gives a delivery of 5.3 inches for each revolution.

Following are some of the principal calculations for the comb.

Rule I. To find the production of the comb in pounds: Multiply together the number of revolutions of the cylinder per minute, the length of sliver delivered at each revolution, the weight in grains of a yard of lap, less the percentage of waste, the number of laps and the minutes run per day, less 10 per cent. for time lost in cleaning. Divide the product by 7000 (the number of grains in one pound) multiplied by 36 (the number of inches in one yard) and by the draft of the comb.

Example: Speed of cylinder, 80 R. P. M.; inches delivered by the coiler calender rolls at each revolution of the cylinder, 5.3; weight in grains of one yard of lap, 212.5, number of laps, 6; minutes run per day, 540; draft of comb, 24.47.

$(80 \times 5.3 \times 212.5 \times 6 \times 540) \div (7000 \times 36 \times 24.47) = 291{,}924{,}000 \div 6{,}166{,}440 = 47.34$ pounds.

In this example, the weight of the laps is given as 212.5 grains, or 250 grains less 15 per cent. for waste, which is a fair average.

Rule II. To find the draft of the comb between the calender rolls in the

coiler and the feed rolls: Multiply together the driving gears and the diameter of the coiler calender rolls and divide the product by the product of the driven gears multiplied together with the diameter of the feed rolls. The driving gears are C, E, G, I and K. The driven gears are D (draft gear), F, H, J and L. In order to avoid fractions, the diameter of the feed rolls, which is ¾ of an inch can be called 12, as there are 12/16 in ¾ of an inch and the diameter of the coiler calender rolls, which is 1 11/16 inches, can be called 27.

Example: (38 × 5 × 53 × 21 × 24 × 27) ÷ (18 × 1 × 90 × 16 × 18 × 12) = 137,032,560 ÷ 5,598,720 = 24.47 draft.

Rule III. To find the draft factor: Proceed as in rule II., but omit the draft change gear D.

Example: (38 × 5 × 53 × 21 × 24 × 27) ÷ (18 × 1 × 90 × 16 × 12) = 137,032,560 ÷ 311,040 = 440.53 factor.

Rule IV. To find the draft: Divide the factor by the number of teeth in the draft gear.

Example: Draft gear 18 teeth.
440.53 ÷ 18 = 24.47 draft.

## Thick Places in Cotton Yarn.

Many difficulties are caused in spinning cotton by running the machines at a high speed to increase the production. Spinners are constantly on the lookout for remedies for these evils other than a reduction of the speed, and for this reason the following hints will be of interest.

The presence of thick places in yarn is a direct result of running the mules at a high speed. These short, soft places in the yarn vary in thickness

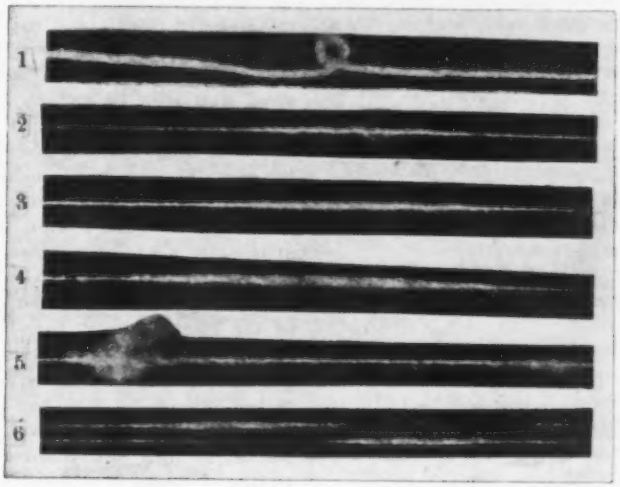



FIG. 1.

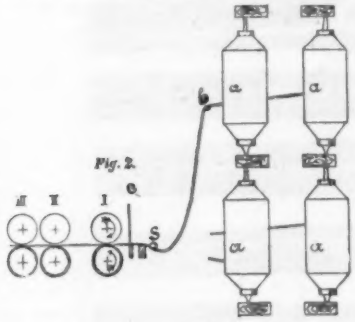
1. Roving; kinks formed by spool revolving after roll have stopped.
2. No. 30 warp; thick place caused by kink shown at No. 1.
3. No. 20 warp; thick place caused by a somewhat larger kink than No. 1.
4. No. 12 filling; another thick place caused by a kink.
5. Flyings attached to the yarn.
6. No. 16 mule yarn; thick place arising from bad splicing in the roving.

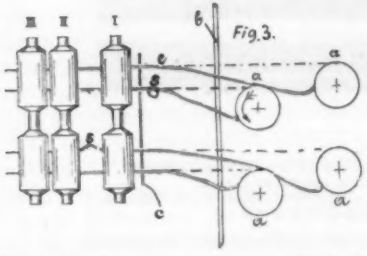
and give the consumer good grounds for complaint. At 2, 3, 4, Fig. 1, are represented samples of these thick places which appear suddenly and then disappear. The manufacturer is usually at a loss to account for them and in most cases it is the consumer of the goods who first discovers them. There are many causes for these imperfections, but frequently they arise from kinks in the roving close to the rolls or yarn guides while the rolls are stopped, or from bad splicing when putting in new spools. In rare instances they are caused by the fly-

ings. A thick place caused by flyings is illustrated at No. 5, Fig. 1.

Spools having sharp, smooth bearings which allow the spool to revolve easily, combined with rolls set close together, a hard twisted roving and long stapled cotton are very apt to cause this trouble.

Press rolls which have been newly covered with leather will also cause thick places in the yarn for several days after they have been put into the machine. This can be readily observed when all the rolls of a frame are covered at one time. By observing the work after these newly covered rolls have been started, thick




places in the yarn will be noticed as the yarn passes to the bobbins; after a few days this difficulty disappears.

It is well known that the surface of roving is not perfectly smooth, but that fibre ends jut out in every direction. These ends catch on to each other when brought into contact and prevent kinks like the one shown up at No. 1, Fig. 1, from being straightened out, consequently these kinks are drawn through the rolls. In such a case the proper draft does not take place, and a thick place is caused in the yarn. The thick places offer more resistance to the twist, and are much softer than the rest of the yarn, although they are generally strong enough to remain unbroken and pass to the bobbin. These kinks occur at irregular intervals and consequently are not noticed. (Fig. 2) is a sectional plan of spools and rollers of a mule. The threads from the upper row of spools (a) pass over the rod (b) through the yarn guide (c) and the pair of rolls I. Fig. 3 is a plan of the rolls and spools. The thread is drawn from the spool in the direction shown by the dotted line (a, e), and if the spool moves rapidly and easily in its bearings, it gets under such headway that when the rolls are stopped the spool continues in motion for some distance, causing the yarn to slacken, and form kinks like the one shown at (s); these are very apt to be drawn in between the rolls when the machine starts again. Such a kink is shown at (s) after it has been drawn through the first set of rolls.

Aside from the imperfect working of the machine itself, there are four causes for thick places in cotton yarn: 1, bunches of waste adhering to the thread, Fig. 1, No. 5; 2, bad splicings when putting in new spools, Fig. 1, No. 6; 3, rolls newly covered with leather; 4, kinks in the roving, Fig. 1, No. 1, 2, 3 and 4.

The only remedy for the imperfections arising from causes 1, 2 and 3 is breaking out of the bad places in the yarn. The difficulty arising from cause No. 3 will disappear after the rolls have been run awhile. The formation of kinks may be prevented by a proper twisting of the roving, timing of the mule, narrow thread guides and by preventing the spool from revolving after the rollers have stopped; this can be done by having the bearings of the spindle made so as to create a slight friction, or by stretching a piece of twine along the rod over which the roving runs.—Herr. Koldt, Spinning Supt. in Leiziger Monatschrift fur Textil-Industrie.

**Temperature and Humidity in Mills.**

Temperature and humidity in textile mills has an important bearing upon the health and efficiency of the operatives, and the working of the stock. In converting textile material into yarn the millions of fibres are so many feelers constantly in motion, while being twisted and drawn; under these conditions electricity is generated which affects materially the manipulation of the stock. While we have read a great deal recently in regard to this subject of temperature and humidity in textile mills, most of it has impressed me as being too much on the rule of thumb lines, that is to say, scientific principles have been lacking in the discussion.

The various directions for the regulation of temperature and humidity have reminded me of the remedy for a cold given by our old housewives—molasses and rum. Some extreme prohibitionist would prescribe various kinds of hot baths, and so on ad libitum. One says that his grandfather always took rum and molasses; another remembered well that his grandfather prescribed aconite, soaking the feet and eating boiled onions before bed-time. They would associate these remedies with some old ancestors who were generally looked upon in the family as "just the article." They would have no idea of the why or wherefore of the prescriptions. It was sufficient for them that their ancestors had used them. Most of us will recall directions in regard to the regulation of temperature and humidity in cotton mills which resemble in principle these remedies for a cold.

Many of us will remember the man, who, a few years ago, was imbued with the idea that with the use of the microscope manufacturers could select cotton which would spin well even in dog days, and thus dispense with any regulation of humidity in the workrooms. He claimed that by means of the microscope, the cotton containing the largest amount of well filled oil pockets among the fibres could easily be recognized and used when the dog star exercises its most pernicious influence upon our atmosphere. This man agitated the subject so thoroughly that I presume all of our manufacturers provided themselves with microscopes; nevertheless, our carders and spinners are still bothered by atmospheric conditions in dog days.

Although the claims made by this individual were absurd, yet back of it all was the underlying principle which points to the direction in which investigation should be carried to find a remedy for the effects of climate on cotton spinning. It suggests to us a means by which the rule of thumb or quack method can be dispensed with. The microscope will not reveal the whys and wherefores of the varied effects of temperature and humidity upon different grades of cotton fibre, but we can by experiment determine that certain effects result from certain temperatures and degrees of humidity, and thus draw valuable deductions from a long series of experiments.

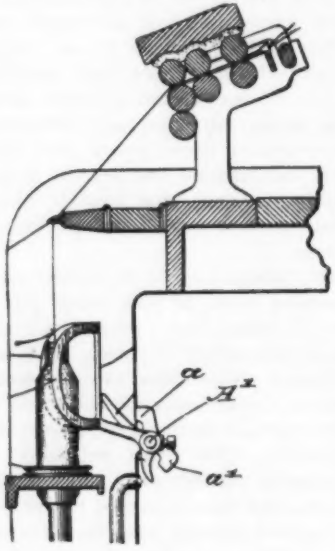
The cotton fibre in its natural state contains more or less waxy oil of such a nature that it requires a fairly high temperature to soften it. When softened these fibres can be easily drawn, consequently the operations of drawing and spinning are greatly facilitated. The waxy substance is unequally distributed among the fibres, and this is one of the causes of uneven drawing when the air is not in condition to soften the wax thoroughly, and distribute it evenly among the fibres.

An excessive amount of moisture in the air causes the wax or oil in the fibre to become too soft; in this condition the fibres slip away from each other, and the roving or yarn cannot be easily drawn. In this connection I wish to draw attention to the importance of preparing the air in our mills previous to starting up on Monday morning. It is a false economy to try and save a few pounds of coal by allowing the mill to start up with the

wax and oil in the fibres thoroughly congealed. The men in charge of the boilers in our mills are naturally intent upon saving coal, and pay no attention to the loss caused by starting work in the spinning room with the atmosphere cold and unfit for spinning. PAUL.

### Separator for Spinning Frames.

The accompanying illustration shows a device for separating the threads while in process of spinning. It has for its particular object a novel construction and operation whereby each separator protects or governs the ballooning of the yarn of two spindles.




Such construction is said to be simple and effective and at the same time reduces the number of separators to substantially one-half the number of the spindles.

In the present invention the rock-shaft A′ is mounted back of the vertical path of movement of the ring-rail in suitable bearings A× on the main frame; to this rock-shaft is secured the series of separators, stops a a′, also fast on the rock-shaft, being arranged to co-operate alternately with a suitable fixed part of the apparatus—as, for instance, the frame—to limit the rocking movement of the shaft in each direction.

The separators are shown as made skeleton in form, although they may be made as thin plates or blades bent or curved into proper shape.

—According to the official statistics there was consumed in Russian mills in the first half of the year 1900, 269,845,450 pounds of cotton, of which 49⅞ per cent. was American, 43¼ per cent. Russian, 5½ per cent. Persian, 1⅛ per cent. East Indian, and ¼ per cent. Egyptian cotton. This is at the rate of 539,690,900 pounds for the whole year as compared with 582,569,522 pounds reported for the year 1899. In the last named year, 32 per cent. was reported as Russian and the balance, 68 per cent., as imported cotton. F. Gunther, writing from Moscow to the Liverpool Cotton Gazette, says there has been an enormous increase in the producing capacity of the Russian cotton culture during the last few years, and there is no room for doubt but that the efforts to enlarge the area under cultivation will continue as strenuously as ever; but on the other hand (leaving aside the present period of stagnation), the consuming capacity of Russian mills is also growing rapidly. At present this country, Russia, is not able to supply her own wants of the raw material and must meanwhile continue to fill the gap buying American cotton. As time goes on she will naturally make herself more and more independent of the American cotton markets. The Russian cotton crop of 1899 amounted to 363,367 bales of 500 pounds, and that of 1900 of 514,543 bales.

—According to a German process the mercerizing of the cotton and the degumming of the silk in half silk goods can be effected in one operation by passing the material through a bath of caustic soda and glycerine. The last named substance prevents the shrinkage and curling of the cotton fibre and at the same time preserves the silk.

# WOOLEN DEPARTMENT.

The TEXTILE WORLD asks practical men to contribute articles for this department. We pay for articles accepted. The acceptance depends entirely upon the value of the ideas expressed. We make all necessary revisions, and urge practical men to contribute, regardless of experience in writing for publication. Illustrations add much to the value of an article, and photographs and sketches are desirable. All communications are confidential, and under no consideration is writer's name published or made known without his permission.

## Finishing Wool and Mixed Fabrics.

IV.

BY N. REISER.

(Translated from the German for the Textile World.)

(Cont'nued from July.)

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Cloth for Riding Trousers:—These goods are generally made in medium quality; a mixture of Australian, South American or Cape wool is used for both warp and filling. The goods are dressed with 5300 threads; 71 to 75 inches wide in the loom; warp and filling 5½ runs; weave, Fig. 15. Heavy cloths are made with a backing warp or filling, sometimes with both.

The weave shown at Fig. 16 is for a

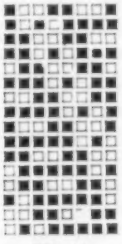

FIG. 15.

filling back woven 2 face, 1 backing; the backing yarn varies from 1⅝ to 2½ runs. Fig. 17 shows a weave for both warp and filling back; The warp is arranged for four face and one backing; the filling, two face and one backing, or one stuffing, one backing and one face pick. The stitching in this weave is not faultless, but is as good as it can be made. The writer has used this weave extensively and it has given good results when the fabric was otherwise well constructed. This weave is stitched on the stuffing or middle pick in order that the appearance of the face may not be changed. The backing warp is spun from low price stock, such as a mixture of ⅛

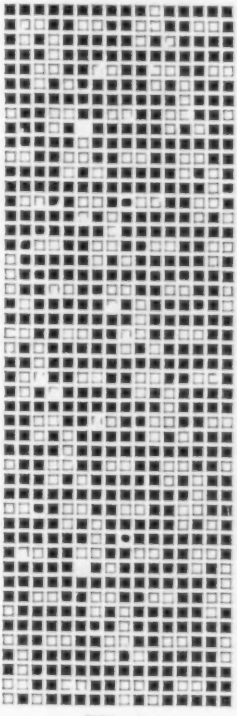

FIG. 16.

Buenos Ayres wool, ½ worsted noils and ⅜ shoddy. The face warp is spun about 6½ run; the backing warp, 6½ run; the face and stuffing filling, 6 run; the backing filling from 1⅝ to 2¾ runs. The warp is dressed 6650 threads, loom width from 67 to 71 inches.

The finishing process is as follows:

The goods are burled, sewed, weighed and measured to determine the necessary amount of fulling. Some mills full these fabrics in the grease, while others first scour them out. Carbonizing, if necessary, should be done before fulling. The goods are fulled

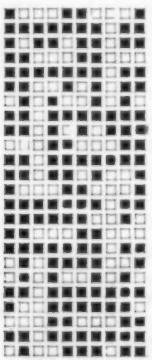

FIG. 17.

from 3 to 5 hours. As it is not necessary to have a well felted face on these goods, the fulling is generally hastened by running the pieces double in the mill. After washing and extracting, the goods are broken in on the gig, dried and carefully sheared. They are then wet out and the gigging completed on the double gig; this operation requires 5 to 6 hours.

The back is then napped and the face well laid on the wet gig, after which the goods are wound upon rolls and left for twelve hours. They are then extracted and dried, carefully back burled, steamed and given 4 to 6 runs on the long cut and two runs on the cross cut shear. They are then pressed with the face down in the rotary, steamed on the roll for thirty to forty minutes and left to cool for twelve to fifteen hours. Instead of letting them cool on the rolls it is better to press them in the hydraulic.

After coloring they are well rinsed; if colored with dyewood, fuller's earth is used. The face is then straightened on the wet gig, the goods wound on rolls and left for twelve hours. After drying they are back burled, steamed and given one or two runs on the cross cut shear. If the goods do not have sufficient lustre they are again pressed, steamed on the rolls, wet out and wound on rolls as before; otherwise they are specked and pressed in the stich press.

If the goods are wool dyed they are burled, sewed, measured, weighed, washed and then fulled and scoured. They can then go direct to the double gig. After the face has been sufficiently gigged the back is napped; the gigging of the face is then completed on the single gig. After drying the goods are back burled, brushed and sheared as close as the quality of the goods will permit.

As is well known the finer grades require a closer shearing than the low or medium quality. The cloth is now wet out and the face well laid on the wet gig. After extracting and drying they are back burled, steamed and brushed, the shearing is then completed on the cross cut machine. The cloth is next specked, brushed, pressed twice in the hydraulic, lightly steamed on rolls, wet out, nap straightened on the wet gig, dried, steamed on both back and face, and given several runs on the shear.

Eskimos, Beavers, Moskows and Similar Fabrics:—Until within the last thirty years these goods were made only in the best grades; but now they are produced in the lower grades and sold at many different prices. Formerly the four leaf broken warp twill was used; now the face and back are sometimes woven with a plain weave. The very finest goods are made out of fine Saxony wool. For the ordinary fine grade a mixture of Saxony and Australian or Cape wools are used for face warp and filling; the backing warp is spun from a mixture of South American wool, worsted noils, shoddy, yarn waste and similar material.

In many cases, particularly when the goods are intended for ladies' cloaks, a percentage of mohair, alpaca or animal hair is used in the backing filling; a light gigging will comb out this back and give it a wavy appearance. For medium grade fabrics a mixture of Cape or South American wool.

shoddy and noils is used. The better grades are laid out as follows: Warp, 4800 to 5300 ends; 83 inches wide in the loom; face warp and filling, 5½ to 6¼ runs. These goods are sometimes made with 4600 to 4800 threads 79 inches wide in the loom; face warp and filling, 5 run. Formerly the size of the warp was increased as the number of threads decreased, but now more regard is paid to the cost of the goods, which are produced with every possible size of yarn; frequently these fabrics are now made with a 4¼ run yarn, 3800 ends in the warp; in order to save warp material the yarn is sometimes dressed 3 face and 1 back with 3600 ends; the price has sunk so low that they are made with cotton yarn for backing warp.

The less ends there are in the warp the more the filling shows upon the face; with the four leafed twill a reduction of a number of ends in the warp gives the goods the appearance of a plain weave. These low grade goods are made from all kinds of raw material (except good wool) such as noils, shoddy, thread, waste, cotton, etc. For the better grades the weaves shown at Figs. 18 and 19 are generally used. The warp and filling is arranged two face and one back. The double plain weave which has been used for these goods for several years is shown at Fig. 20.

These goods are finished in many different ways, of which we will describe a few. First method for piece dyed goods: The goods are first burled and sewed. It is not necessary to sew the threads in very carefully as in many cases the finished face is not affected if they are left out. The cloth is measured, weighed and then scoured. If a good oil has been used in the stock, certain piece dyed fabrics can be washed out with a three to five per cent. soda solution containing a small quantity of soap. The goods are now carbonized, rinsed, dried and fulled; they are shrunk from five to seven per cent. in the length and the width in the mill is left about 2½ inches wider than the finished width desired; 70 lbs. of cloth requires about 8 pounds of fulling soap; a proportion of soda is added in order to remove any trace of acid that may remain. It is important that there should be a firm felt in the goods in order that a thick fine nap may be obtained by gigging; the fuller should not use too much soap, otherwise the cloth will not full well in the length; a better felt is obtained by fulling with a small quantity of soap; the goods should not be too moist when being fulled, otherwise the felt will be uneven, and the finished goods have a scaly look; the fulling of these goods is sometimes begun in the rotary and finished in the hammer mill.

FIG. 18.

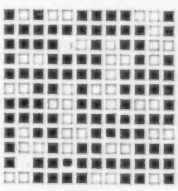

FIG. 19.

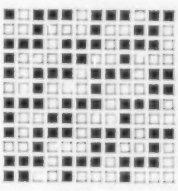

FIG. 20.

After fulling, which lasts from 2 to 4 hours, the goods are rinsed and partially gigged, then extracted and cropped lightly. This preliminary gigging is sometimes omitted, and the back of the goods gigged before the face. After wetting out, the goods are gigged for about 2 hours on the double gig and then the gigging is completed with from 8 to 9 runs on the single gig. They are then extracted, dried, back burled, sheared on the long cut machine, pressed in the rotary, pressed twice in the hydraulic,

steamed on rolls for 30 to 40 minutes, left to cool and then colored, rinsed, dried, steamed and given 2 to 4 runs on the shear. The cloth is then pressed hard in the rotary, steamed on rolls and left to cool. It is next wet out, the nap straightened on the wet gig, extracted, dried, napped on the back, steamed, brushed, given 2 or 3 runs on the cross cut shear, pressed twice in the hydraulic, if necessary, and then steam brushed.

Wool Dyed Eskimos:—After burling, sewing, measuring and weighing, the goods are washed; as the backing filling contains more or less dirt, soda should be mixed with the soap; the use of alkali at the beginning of the scouring process is not attended with any danger or damage to the goods; it is only when the goods are nearly clean that the action of the alkali is to be feared. The goods should be very carefully examined and in case there is any danger of washer wrinkles the pieces should be straightened from time to time; in some cases it is necessary to cut them out and run them in the opposite direction; using a smaller guide eye in the washer sometimes prevents the formation of wrinkles.

Great care should be taken to prevent fulling wrinkles as it is impossible to remove them after they are once formed; the goods should not be fulled when too warm or too dry, since wrinkles are very apt to form under these conditions. It is well to stretch the goods from time to time in order to prevent these wrinkles. In case they appear, the goods should be scoured in the full width washer, then wound on rolls and immersed in water as hot as the color will stand. After fulling the goods are washed, extracted and gigged with dull work on the single gig. They are then dried, back burled, given several runs on the shear, wet out, gigged on the back and then on the face; the gigging is then completed on the single gig. The goods are now extracted, dried, back burled and given a couple of runs on the shear. They are now pressed on both back and face in the rotary, steamed on the roll for 15 minutes, and then, according to the fastness of the color, are either taken from the rolls immediately or left to stand.

The pieces are now wound on rolls and immersed in water as hot as the color will stand, then rinsed, the nap straightened on the wet gig, extracted, dried, back burled, brushed, steamed, given a couple of runs on the cross cut shear, specked, steam brushed, again sheared and then pressed both back and face in the rotary.

Beavers With and Without Lustre:—By Beavers we mean a thick fabric similar to Eskimos, but differing from the regular Eskimo in the method of finishing. The goods are first burled, sewed, washed, fulled, gigged on both back and face, wound wet on rolls and left to stand 12 hours; they are then dried and the nap well brushed during the drying process. The goods are next given 4 to 6 runs on the shear, pressed hard in the rotary, steamed on the roll for 15 minutes, pressed again in the rotary, steamed on rolls for 30 minutes and left to cool; the hydraulic press should not be used for these goods. They are then wet out, the nap straightened on the wet gig, extracted, dried, back burled, steamed, brushed and given 4 to 6 runs on the long cut shear. The back is then well napped and the goods brushed, given several runs on the shear and then brushed on a machine that has brushes moving diagonally across the pieces. If less lustre is required the goods are pressed and steam blown.

(To be continued.)

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—The U. S. Board of General Appraisers have decided that wool or hair of the Cashmere goat, sometimes called China brown cashmere wool, is dutiable as wool of the second class, at 12 cents per pound.

—A thought can be new only in its expression. There is no truth that has not passed, more or less confused, through the mind of man.—Anon.

## An Improved Mule Carriage and Rail

Several months ago we noted that experiments were being made to improve the mule carriage in an Oldham, Eng., cotton mill, by which the rail was sunk below the level of the floor, thus preventing any obstruction to the passage of the operative in front of the carriage. The accompanying illustrations show this device, which has

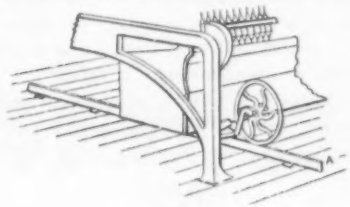

Fig. 1.

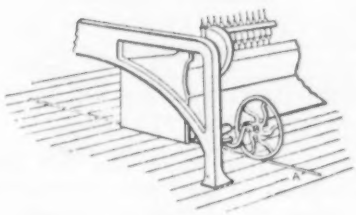

Fig. 2

Fig. 3.

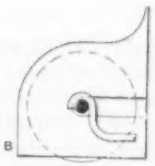

Fig. 4.

since been perfected. Fig. 1 shows the usual arrangement of a mule carriage with the ordinary raised rail. Fig. 2 is that of a carriage with the improved or sunken rail. Fig. 3 is a sectional plan of the floor showing the manner of setting the rail. Fig. 4 is a side view of the carriage wheel adjusted to run on the sunken rail. Besides lowering the rail an additional safeguard is provided by covering the carriage wheel as shown at Fig. 4.

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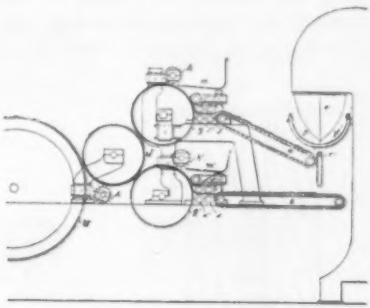
--Carefully conceal your superiority for fear of making enemies.—Schopenhauer.

## Machine for Removing Burrs from Wool.

In the accompanying illustration is shown a machine which has been built recently in Turcoing, France, for removing burrs and other foreign substances from wool. It is provided with two feed tables (a) and (b). The self feed automatically drops the wool alternately on these two tables. From the feed tables the wool passes through feed rolls to the carding cylinders (g) and (g'). These cylinders



carry the stock under the burr guards (h) and (h'), by which the burrs are knocked into the pans m and m'. Both of these cylinders are connected with a third carding cylinder j which takes the stock from both of the others and unites it into one web. A third burr guard placed under the cylinder (j) knocks out any burrs which may have been left in the stock by the other guards. From the cylinder (j) the stock passes to the large carding cylinder (v).

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—According to the report of the Massachusetts Bureau of Labor Statistics, the total amount paid in wages in that state and the averages for each employee in the various branches of textile manufacturing, in the year 1900 were as follows:—

| | | | |
|---|---|---|---|
| Cotton | total | $33,453,372 | av. $361.17 |
| Woolen | total | 8,004,814 | av. 402.01 |
| Worsted | total | 5,459,841 | av. 375.66 |

The average proportion of business done was as follows:—Cotton 91.4; Woolen, 80.75; Worsted, 77.5 per cent.

### Device for Preventing Mill and Washer Wrinkles.

An attachment for fulling mills and washers has been patented in Germany, which has for its object to prevent the formation of mill and washer streaks. Fig. 1 is a front view of the device which consists of two guide rolls, (a), and (b), which are both fluted in a spiral form in the same direction; the cloth, (c), passing between these rollers, cause them to revolve in opposite directions. It is claimed that these spiral grooves act as a screw on the cloth, working it into different positions so that the folds in the goods are being constantly changed. Fig. 2 is a side view showing but one of the rollers. Fig. 3 is an end view of one of the rolls, showing the form of the corrugations. The rollers are set in slides in the frame of the machine, and are held in position by springs, which yield when hard lumps or seams in the cloth pass between the rolls.

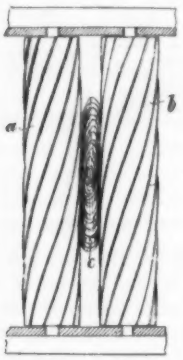



Fig. 1.

Fig. 3.

—Vegetable dyes only are used in the production of colors for Gobelin tapestries. Six series of graded shades, each composed of twelve colors used in the manufacture of Gobelin were exhibited at the Paris exhibition last year, and have now been placed in the historical museum at Lyons.

### A Woven Fabric.

The accompanying diagrams illustrate a woven fabric recently patented in this country. It is intended for the production of a fabric resembling a Brussels carpet fabric and can be produced on an ordinary loom without the use of pile wire mechanism.

Figure 1 is a section of the fabric, taken in the direction of the warp. Fig. 2 is a section taken in the direction of the weft; and Figs. 3 and 4 are views of another form of fabric.

The fabric consists of sets of patterning warp-threads alternating with pairs of binding warp-threads and pairs of heavy weft-threads, which may also, if desired, be used for patterning purposes, these heavy weft-threads alternating with pairs of binding weft-threads.

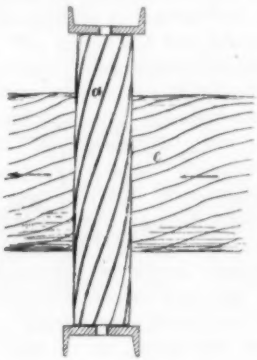
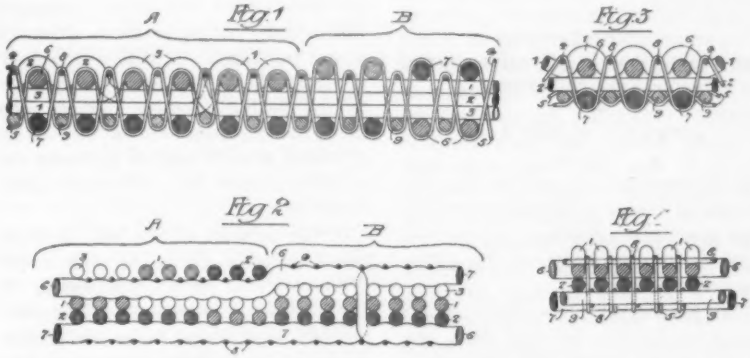



Fig. 2.

Each set of patterning warp-threads may comprise two, three, or more, these threads constituting, either alone or in conjunction with the heavy weft-threads, the surface threads of the fabric, whereby the pattern is produced. Each set of these warp-threads produces on the face of the fabric successive loops resembling the looped pile-threads of an ordinary Brussels carpet, the difference being that instead of being tied into a backing fabric and otherwise unsupported these loops are filled and supported by heavy weft-threads of the fabric.

Either of the heavy weft-threads may serve as a pile-loop filling or supporting thread, and may also, in addition to performing this duty in certain parts of the fabric, appear upon the face of the fabric in other parts, so as to diversify the coloring of the pattern, the heavy weft-thread not so employed appearing upon the back of the fabric and the two weft-threads




being tied together by the binding warp-threads, which also tie together the binding weft-threads, the latter serving to bind down and indent the pile-forming warp-threads between successive heavy weft-threads, so as to produce the desired pile loop effect.

In the fabric shown in Figs. 1 and 2 of the drawings each set of patterning warp-threads comprises three threads, 1, 2, and 3, these sets of warp-threads alternating with the binding warp-threads 4 and 5 and the pairs of heavy weft-threads 6 and 7 alternating with the pairs of binding weft-threads 8 and 9, either of the patterning warp-threads of a set being carried to the face of the fabric, in accordance with the requirements of the pattern, and the other warp-threads of the set being embedded between the upper and lower heavy weft-threads, as shown at A in Fig. 1; or all three of the patterning warp-threads of the set being embedded between the upper and lower heavy weft-threads, as shown at B in Fig. 1, when either of said heavy weft-threads is carried to the surface of the fabric, in order to aid in the formation of the pattern.

That portion of the fabric which is lettered A resembles an ordinary Brussels carpet fabric, both as regards the face and back, the lower binder weft-thread 9 being by preference heavier and of a coarser character than the upper binder weft-thread 8, so as to increase the weight and stiffness of the back of the fabric.

The fabric can be easily woven upon a loom such as is now employed for the weaving of ordinary two-ply ingrain carpet fabrics, since the insertion of the weft-threads involves simply a repetition of a certain order of picking four shuttles, as in the ordinary ingrain-loom. The jacquard mechanism, however, should be so constructed that any desired one of the harness-tails may be lifted on each pick of the loom.

If desired, one of the binding warp-threads of each set may tie together the top binder weft-threads and the heavy back weft-threads, and the other binder warp-thread of the set may simply be interwoven with the back binder weft-threads and the heavy back weft-threads, so as to form a back ply, as shown in Figs. 3 and 4.

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—A composition for rendering fabrics waterproof has been patented in France, and consists of a mixture of 900 parts white zinc and 450 parts wax dissolved in turpentine.

# KNITTING DEPARTMENT

The TEXTILE WORLD asks practical men to contribute articles for this department. We pay for articles accepted. The acceptance depends entirely upon the value of the ideas expressed. We make all necessary revisions, and urge practical men to contribute, regardless of experience in writing for publication. Illustrations add much to the value of an article, and photographs and sketches are desirable. All communications are confidential, and under no consideration is writer's name published or made known without his permission.

### The Knit Goods Situation.

The usual report on the Knit Goods Market will be found in another part of this issue.

### The Production of Circular Spring Needle Knitting Machines.

(Copyright 1901 by Guild & Lord.)

It is customary to express the production in dozens of garments per day. This is a convenient way because the dozen—of No. 40 shirts—is the manufacturers' selling unit.

The production per cylinder is obtained by dividing the total daily production by the number of cylinders in the mill. This gives the commercial production—just what the manufacturer, established or prospective, wants to know, because these are figures from actual practice, and that means that all of the conditions which effect the production have been taken into account.

There are a few points regarding this method of getting the production that should be remembered. Suppose a mill manufactures 350 dozens per day and contains 50 spring needle cylinders. The production per cylinder is 7 dozens. Now suppose the mill is making 12 pound fleece goods. Then the production per cylinder is 84 pounds. This record in pounds is the rational one, because the cylinder does not produce finished garments. As a rule one cylinder makes the body cloth and a "sleever" makes the sleeves; consequently, considering the shirt cylinders, where 7 dozens of garments are credited to a cylinder, it actually makes nearly 10 dozens of bodies and another cylinder makes the sleeves.

Again, it is assumed that 7 dozens of 12 pound goods is 84 pounds; but this weight includes the cuffs, which are knit on the cuff frames and should not be credited to the large cylinders. The weight of the cuffs is about .6 pound per dozen. If this is deducted, it leaves about 80 pounds per cylinder as the selling product, but actually the cylinder produced about 84 pounds, of which about 4 pounds has been cut to waste, while the cuffs just about make this up.

If the product of the mill is composed of piece goods, 84 pounds per cylinder would be the production. If the product is increased by 70 dozens per day, that would mean 840 pounds more, for which 10 cylinders could be counted on to produce 800 pounds and cuff frames would knit the other 40.

The needle speed and the number of feeds per cylinder are not always alike. If the needle speed and the number of feeds per cylinder were alike, the production in pounds per cylinder would be the same regardless of the diameter of the cylinder. This seems strange to those who associate the weight of the production with the diameter of the cylinder, but it is readily realized, by considering that, if the needle speed is constant, the yarn will run into the needles at constant speed; if the number of feeds are alike the weight of the yarn must be the same.

Other things being equal, the weight of the product is, however, proportional to the diameters of the cylinders, when the cylinders make the same number of revolutions per minute, because in such a case the needle speed increases in direct proportion with the increase in the size of the cylinder; that is to say, if a 20" cylinder knits 100 pounds at a certain

number of turns a 15″ cylinder making the same number of turns will knit 75 pounds. It is, however, not practicable to run a large cylinder at the same number of turns as a small one.

As far as the knitting is concerned the needle speed decides the number of turns of the cylinder, and once that speed is determined the number of turns should be inversely proportional to the size of the cylinder; for instance, if a 20″ cylinder making 60 turns has the proper needle speed for that cylinder then a 15″ cylinder should make 60 × 20/15 turns, or 80 turns.

There are some knitters, however, who cannot let the logic of this overcome their prejudice against running the small cylinders fast; so they content themselves, if not their employers, by a nearly constant number of turns for all sizes. Then there are also those who find that under the particular conditions of their work high speed on the small cylinders is detrimental either because of the damage done when smashes occur or for other reasons, and that being the case, they are justified in not using high speed. Although this may be the situation in some mills, it is certainly not so in a large proportion of them; in some of the former it is probable that there is a little prejudice mixed up with the objections, because a number of theoretical considerations indicate that even higher needle speed may be used on small cylinders.

As the size of the cylinder decreases the number of needles engaged by the sinker burr decreases, owing to the increased curvature of the needle line, consequently the burr runs more freely in the needles and there is less tendency to overreach. Besides, there being less needles engaged, the yarn is looped into the needles with less stress. This stress on the yarn at the loop wheel is not generally appreciated. It is one of the objectionable features of the loop wheel. Every knitter knows how rapidly the sinker blades wear at the nib. This is partially owing to the concentration of the wear to one locality, but it is largely due to the dragging of the yarn across the nib as the yarn enters the needles.

(To be continued.)

## Scouring Hosiery.

Frequently the manufacturer has a new class of goods to make for which he is in doubt as to the proper means of handling in the various departments, and it is often very difficult to determine at the start how these goods should be handled in the scouring. Probably no product is subject to so many adulterations as soap, and for this reason every manufacturer should test the soap used in his mill at frequent intervals. Nothing cleanses wool and woolen goods so well as a pure soap, and if proper care be taken in its use it gives the goods a soft handle.

It is impossible to prescribe any fixed formula for a mixture of soap, soda ash, and sal soda for scouring knit goods, as variations in the quality and weight of the goods necessitate corresponding changes in the composition of the scouring liquor. The best way is for the manufacturer to experiment with different proportions of soap and alkali, and note carefully the results.

I will give some simple tests for impurities in soap. Dissolve an ounce of the soap in a given quantity of water, and add a quarter of an ounce of dilute sulphuric acid. The grease and fat will come to the top, while the earthy matter will fall to the bottom. The same results may be obtained by dissolving the soap in a strong solution of alcohol and heating the mixture. I have used the following formula for scouring hosiery with good results: 20 lbs. of caustic soda and 20 lbs. of sal soda dissolved in a barrel of water and boiled one hour; then add 12 gals. of red oil. Boil the mixture another hour and then reduce it by the addition of three barrels of hot water. When cool it is ready for use. Only enough should be used to make a good lather when scouring the goods.

OLD SUPERINTENDENT.

### A New Automatic Folding and Cutting Machine.

The folding and cutting machine shown in the accompanying illustration is built by J. C. Goodwin, Second and Diamond Sts., Philadelphia, Pa., and possesses many improved features which have not heretofore been embodied in any other machine for folding and cutting of knit goods facings. One great advantage which it possesses is the quickness with which changes can be made from one cut to another. No gears are used for this adjustment, it being necessary merely to take out or add the necessary links of the chain. This machine will cut any size from three inches to three feet. It has an instantaneous stop motion and automatic drawing knife. The feed is stationary, while the knife is cutting, thus avoiding any danger of clogging the machine with goods.

The builders claim that it costs much less than other cutters on the market, is one-half lighter in weight and size and has greater efficiency. It is particularly well adapted for the requirements of underwear manufacturers. Further particulars can be obtained from the manufacturer on application.

A NEW AUTOMATIC FOLDING AND CUTTING MACHINE.

### Some Causes of Imperfect Knit Goods.

To overcome the many causes of imperfections in knit goods it is first necessary to have competent men at the head of the different departments in the mill. Assuming that this has been attended to let us first examine the yarn furnished to the mill, and from which operatives are expected to make perfect goods. It is not uncommon for this yarn to be both lumpy and irregular in size, a combination of defects which is well calculated to produce seconds and destroy both needles and knitters' patience.

I will illustrate this point by citing a case which recently came under my observation. Two sample boxes of yarn were delivered to the mill. Box

No. 1 contained 378 lbs. of cotton yarn on cones, which cost 14¼ cents per lb., and from which was knit 376 lbs. of webbing. After cutting into legs and tops the resulting product was as follows: 119 doz. of perfect legs; 44 doz. 9-pair menders; and 37 lbs. 13 oz. of waste; this would sum up approximately as follows: 25 per cent. of menders and 10 per cent. of waste; 237 needles were broken in knitting the yarn, or about one needle for each half dozen of perfect legs. The second box contained 384 lbs. of a higher grade of yarn costing 15½ cents per lb. It was knit on the same machines by the same hands and immediately after the first lot with the following result: 382 lbs. of webbing from which were cut 175 doz. of perfect legs, 9 doz. 3 pair menders, with 4½ lbs. of waste and a breakage of 18 needles or about one needle for each ten dozen of perfect legs. It will not take a very intricate calculation to demonstrate from this comparison that the yarn which appeared so cheap when nailed up in the case as it arrived at the mill was anything but cheap when knit into goods.

Aside from the quality of yarn the location of the mill has a great deal to do with the number of seconds produced. A mill located in a large knitting centre where there is an ample supply of skilled help will be able to turn out a much better production than one located far from other knitting mills and where green help must be taught to run the machines. Let us take the case of transfer work where the goods must be transferred from one machine to another before the process of knitting is completed. A top with 200 stitches is to be transferred to a machine having 138 needles; this means that the 200 stitches must be looped on the 138 needles or in other words, 62 of the needles must hold two stitches while each of the other needles holds one. A failure to have every one of those 200 stitches on the needles results in making a mender; 4800 stitches must be placed by hand on the needles of the transfer machine in order to transfer one dozen pairs of these goods.

After the stocking has been topped, the foot must be knit on. This requires much care; careless operators, machines out of order, bad needles and imperfect yarn are frequent causes of imperfect goods. Next comes the looper where every stitch must be put in the points to have the toe joined together. After the leg or top has been knit and taken to the topper so-called, all is well if we have an expert operator, but if we have a learner, trouble begins at once. She must be trained before she is of any use in the hosiery business; frequently after spending weeks in the attempt to learn how to do the work she becomes discouraged and drops out, while the work that has passed through her hands finds a resting place among the seconds. Another green hand takes her place and another batch of seconds is the result.

The writer has in mind a mill where in a few months 100 girls were hired as toppers and out of this number only 32 remained and became skilled workers. The same remarks apply to the operations of knitting and looping. The efficiency of the help keeps the knitting industry centered in a few localities, although the more isolated sections of the country may possess superior advantages in the way of raw material, freight, fuel, etc. Seconds may often be made by careless finishing. Take the case of a mill which has been running for some time, and where the help are trying to accomplish fifteen hours work in ten hours; the knitting machines in spite of the greatest care are apt to get out of order, and in the rush the knitter often neglects to call the fixer, thinking the machine will run all right without attention. The result is that a pair of imperfect stockings are made, and the operator slides them into a dozen in order to get them passed.

FOREMAN.

## German Knitting Needles.

As is well known, the ordinary form of latch needle is adjusted in the knitting machine so as to slide it in the grooves provided for it. A cam, working against the hook of the needle, raises and lowers it as required. At the lowest point in the traverse of the needle it is held by the thread that has been hooked on it. Should the thread break or run out, the needle is left free and slides down of its own weight in the groove. This results frequently in the needle being thrown out or bent. Fig. 1 shows an arrangement for preventing this difficulty. A and B are different views of the needles. B shows a slit in the needle, by which it presses against the sides of the grooves and prevents its sliding in the groove of its own weight.

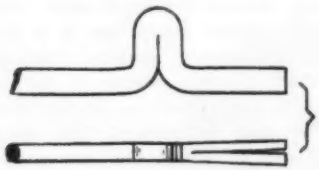

FIG. 1.

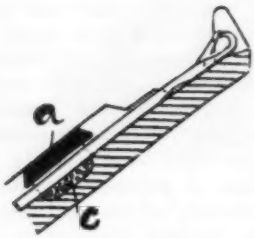


FIG. 2

Fig. 2 is another device for the same purpose. Below the needle rail a groove (c), is cut in the needle bed. This is filled with yarn which reaches across the entire breadth of the needle bed. The ordinary needle is used and the threads in the groove (c), exert a very light pressure on the needle which prevents its falling when left free and yet allows it to be moved very easily by the cam. These threads also keep the needle free from oil and thus prevent the oil from oozing out on the goods and causing streaks. The threads absorb the oil and after becoming saturated yield back a portion of the oil which keeps the needle lubricated; the threads in this way act as a self oiler.

Most of the wear on the needle comes at the hook where the cam strikes, and consequently, a needle in otherwise good condition frequently must be thrown out on account of the wear at this part. Fig. 3 illustrates a needle designed to overcome this difficulty. The hook of the needle (a), is of a swallow tail shape and consequently it can be easily repaired when worn.

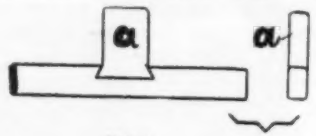


FIG. 3.

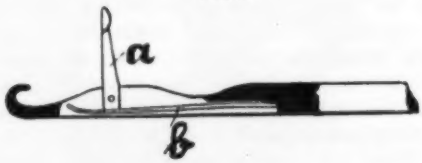


FIG. 4.

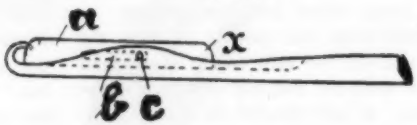


FIG. 5

It often happens that in the hook needle machines the tongue of the needle sticks through the thread. To overcome this the needle shown at Fig. 4 has been invented. It is cut lengthways and a small spring (b), works against the end of it. This spring lies in the groove of the needle, and in order to hold it firmly is slightly tapered. By this arrangement the latch of the needle assumes a perpendicular position whether it be against the hook or the butt of the needle.

Fig. 5 shows another form of needle in which a slide (a), is substituted for the latch. In this slide there is a hole (b), cut and a pin (c), projecting through this hole holds the slide in place; the slide takes the place of the latch; the yarn in the needle presses against the slide, and pushes it back; the thread then slips over the slide and after the hook of the needle has caught another thread the preceding loop presses against the end (x), and then passes over the slide and the point of the needle at which another thread has been hooked, thus forming the stitch.

This arrangement does not require any more power than the ordinary needle. The slide is of the same height as the needle hook, but in the plan is shown somewhat higher, in order to make the illustration plainer to the reader.—Leipziger Monatschrift.

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### A Knitting Machine Needle.

The knitting needle shown at Fig. 1 has recently been invented and patented in this country. The inventor states that the heel of the needle is provided with an enlarging or thickening member applied for the purpose of strengthening the needle thereat, and also to furnish a suitable shoulder when required to bear against the wall of a skeleton cylinder to hold the needle in vertical position in its groove in the needle-cylinder.

Prior to this invention it has been common to apply to the heel of a needle an enlarging or reinforcing member in the form of an endless ring or collar encircling or surrounding the entire heel and retained thereon merely by compression thereupon or else secured by solder or equivalent means. Both of these methods of securing the collar have been objected to as inadequate to prevent displacement of the collar on the heel.

Attempts have also been made to attach a reinforcing-plate by clinching a tongue portion or portions thereof into or through an opening in the part of the needle to which the plate is applied, but without success, for the reason that such a mode of securing the plate has been found inadequate and too costly.

The object of this invention is to provide a needle having an enlarging and reinforcing member applied to its heel in a manner to obviate the objections above referred to. This object is attained by first providing the heel of the needle with a suitable opening, it may be partly in one and partly in the other of said heel members, and then inserting in this opening a wire or strip and bending the two ends thereof, preferably in opposite directions, to embrace the limbs of the heel and produce the requisite enlargement and reinforcement of the heel.

In the drawings, Figure 1, A is a side elevation, and illustrates a knitting-machine needle with its heel provided with a thickening or reinforcing member in accordance with this invention; B, an enlarged sectional detail; C, a view similar to Fig. 1, with the reinforcing member omitted; and D, a view similar to C, showing the opening in the heel entirely in one member.

Referring to the drawings, the knitting-machine needle a is and may be of any suitable or desired construction, it having a usual heel b, formed by bending a loop in the shank of the needle. The heel b is provided with an opening b′, shown in Figs 1, C as partly in one and partly in the other of the two limbs of the heel and in Fig. D, as entirely in one of the limbs.

The thickening or reinforcing member c in the form of a wire or strip, is inserted in this opening b′ and its ends bent, preferably in opposite directions, to embrace the limbs of the heel b. As shown in Figs. 1, A and B, the reinforcing member c is of such length that when bent as described, it completely encompasses

the heel, somewhat like a collar, and assumes a configuration closely resembling a figure 8; or it may be made shorter, so that the ends of wire will not meet the middle where the latter emerges from the heel, but will stop short by a distance which may vary as desired; it then assuming more the shape of a letter S.

In many cases it is sufficient if the ends of the wire or band, when bent, embrace but two of the sides of the respective limbs of the heel. In either case, however, the passing of the wire or strip through the heel, whether between the limbs thereof or through one of the limbs thereof, effectually prevents displacement of the same on the heel, and the bending of the ends of the wire or strip, so as to embrace the limbs of the heel more or less, according to the length of the wire or band, holds the latter in the opening.

The inventor claims that this construction possesses great inherent strength, yet requires no solder or other equivalent material to retain it in its position.

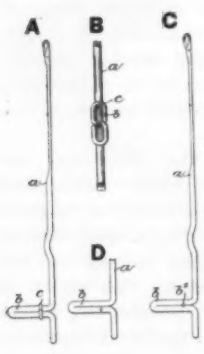



FIG. 1.

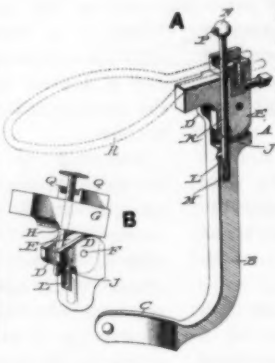



FIG. 2.

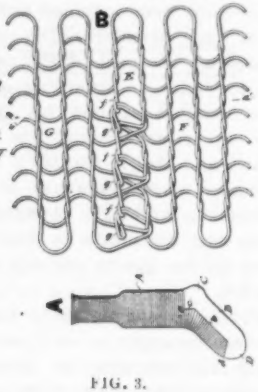



FIG. 3.

## An Automatic Locking Device for Knitting Machine Yarn Guides.

This invention consists of an automatic locking device for yarn-guides of knitting-machines, by which the yarn-guide can be tilted back when it is desired to remove the cylinder from the bed of a machine.

Figure 2A represents a vertical sectional view of an automatic locking device embodying this invention. Fig. 2B represents a perspective view of a portion of the same.

Referring to the drawings, A designates an automatic locking device for yarn-guides of knitting-machines, consisting of a supporting-post B, the lower end of which is provided with any suitable means for attaching the same to the cam-cylinder of a knitting machine, in the present instance by a yoke C, one-half of which is shown. On the other end of this post are the ears D, between which is a footpiece E, which is pivoted by the pin F, the footpiece carrying the head G, which has a shoulder H, adapted to rest on the top of the ears D, which are curved at the rear portion.

The foot E is cut away, forming a shoulder J, while passing through the head is a pin K, movably mounted and in alignment with a plunger L, which is mounted in the post B and is held in normal position by a spring M. The upper end of this pin is provided with a head N, held in position by a screw P, it being noticed that the said plunger L projects between the ears D in front of the shoulder J on the foot E. R is a yarn-guide, secured in the ways Q, carried by the head.

The operation is as follows: The parts appear in their normal position in Fig. 3A. When it is desired to remove the cylinder from the body of the machine, the pin K is depressed,

so as to lower the plunger L below the adjacent shoulder J of the foot E, so that the foot, head, and yarn-guide can be tilted backwardly to any position and the cylinder can be removed from the machine, the rearward movement being permitted by the curved portion of the ears D.

Upon turning the head downward the bottom of the foot E rides over the top of the plunger until it has passed the same, when the spring N forces up the pin and prevents the tipping backward of the head; the shoulder H on the head comes in contact with the top of the ears D, and prevents the downward movement of the head. Suitable means for preventing the plunger from leaving the opening in the post B are employed.

### A Knit Fabric.

Another invention has been patented for split foot hosiery and is illustrated at Fig. 3. Such articles are sometimes termed "split-foot" stockings, and ordinarily the toe, bottom of the foot, and heel portions are formed of yarn which is heavier than and of different color from the remaining portions.

The inventor states that the methods of manufacture heretofore employed for stockings of this character have resulted in the production of a fabric which, although united throughout, was not uniform, that is to say, the foot comprising what may be termed the "two halves" made of different yarn was necessarily composed of two independently knit webs united along their edges by interknitting, and this structure was followed throughout the whole article so that the seam between the two distinct webs was manifest not only where the webs were formed of different yarns, but also where the yarn of both webs was the same, as in the leg portion.

The stocking thus made was therefore characterized by a certain lack of finish or apparent imperfection in that the line of union of the two webs in the leg portion presented the appearance of a seam or partial cord, as distinguished from a smooth and uniform fabric.

This invention is intended to avoid the undesirable features found in a fabric having the structure just described, and to that end the improvement consists in a stocking whose leg portion is composed of a single uniform web having the characteristics of a tube knit by continuous progress of the loops in a spiral direction, while the foot or fraction composing the two portions made of different yarns is formed of two individually-knit webs united by interknitting of their edges to constitute a tube.

He states that it is preferable to employ for knitting the stocking a machine comprising two flat needle-beds disposed at an angle to each other and having a reciprocating carriage which actuates the needles. Such carriage is capable of alternative methods of operation; it may actuate the needles of one bank alone twice during a complete reciprocation back and forth, and then perform a similar function upon the needles of the other bank alone during the next complete reciprocation, or it may actuate the needles of one bank alone on its outward movement and the needles of the other bank alone on its return movement.

The result of the first-mentioned mode of operation is to produce two flat webs independently knit and having their edges immediately adjacent to one another, while the second mode of operation produces a single uniformly continuous tubular web. The two independently-knit webs required for the foot portion can be formed upon such a machine and can be united at their proximate edges by interknitting. The preferred method for effecting such interknitting is to actuate a needle at the end of that row which for the time being is idle and to throw said needle over, so as to take a loop in the fabric which is then being formed upon the opposite row, this action being repeated at each end of

the web during one complete reciprocation of the carriage.

The result is that the loop thus engaged in the web which is then forming, is carried across to the opposite side, so that during the next complete reciprocation of the carriage said loop shall be interknit with the loops of the other web. When this method of operation has been carried on during a period sufficient for the formation of the desired quantity of fabric, for instance, throughout the foot and heel portion of a stocking, it has been found that it is practicable to directly pass to the other or alternative mode of operation, whereby instead of forming two independent webs a single and uniformly continuous tubular web shall be knit.

The fabric thereafter formed will be free from any of the peculiar loops which characterize the line of interknitting of the two webs and will be identical both in construction and appearance with an ordinary tubular fabric formed by continuous progress of the loops in a spiral direction.

The change from one yarn to another at predetermined intervals, whereby the composite fabric of the foot portion is formed, may be effected by any mechanism adapted for that purpose.

## Cuban Imports of Textiles.

The accompanying table gives the value of the different classes of cotton goods imported into Cuba in the four months ending Nov. 30th, 1901. It also shows the proportion coming from each of the principal countries. Great Britain leads the list in every item except that of wearing apparel and knit goods. Of knit goods the greater part (54 1/10 per cent.), come from Spain, while 23 8/10 per cent. was furnished by France and 17 1/10 by Germany. The share of the United States in this trade is very small, being 4/10 per cent. in lace goods and 19 2/10 per cent. in wearing apparel. Evidently there is a market for textiles at our very doors that is now in the possession of European countries.

### Imports of Cotton Goods Into Cuba.

FIVE MONTHS ENDING NOVEMBER 30th, 1900.

| Imported from. | Cloths. $468,794 | Muslins. $886,311 | Wearing Apparel. $76,401 | Yarn and Thread. $191,040 | Tulles, etc. $147,994 | Knitted Fabrics. $329,926 | All Others. $3,531,199 |
|---|---|---|---|---|---|---|---|
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Gt. Britain | 58.9 | 63.0 | 2.5 | 72.1 | 60.9 | 1.7 | 48.0 |
| United States | 9.2 | 7.5 | 19.2 | 1.8 | .4 | 1.5 | 7.0 |
| Spain | 15.5 | 16.7 | 29.4 | 9.4 | 14.3 | 54.1 | 28.5 |
| Germany | 3.7 | 2.7 | 4.4 | 2.4 | 7.9 | 17.1 | 5.3 |
| France | 9.9 | 7.3 | 39.6 | 12.5 | 15.9 | 24.8 | 9.8 |
| All others | 2.8 | 2.8 | 4.9 | 1.8 | .6 | 1.8 | 1.4 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

—A number of the cotton manufacturers of Georgia have followed the recent example of North Carolina mill owners and announced that they will voluntarily restrict the employment of children in their mills. The Georgia agreement provides that no child under 10 years of age shall be employed at all, and none under 12 years of age at night unless there is a widowed mother dependent upon it for support. It is doubtful if such promises will long delay the enactment of a child labor law in the South. Public sentiment is growing rapidly in favor of such a law.

—Justice is the chief virtue of those who command, and by that alone can the complaints of those who obey be silenced.—Diderot.

—It is more discreditable to suspect a friend than to be deceived by one. —La Rochefoucauld.

# SILK DEPARTMENT.

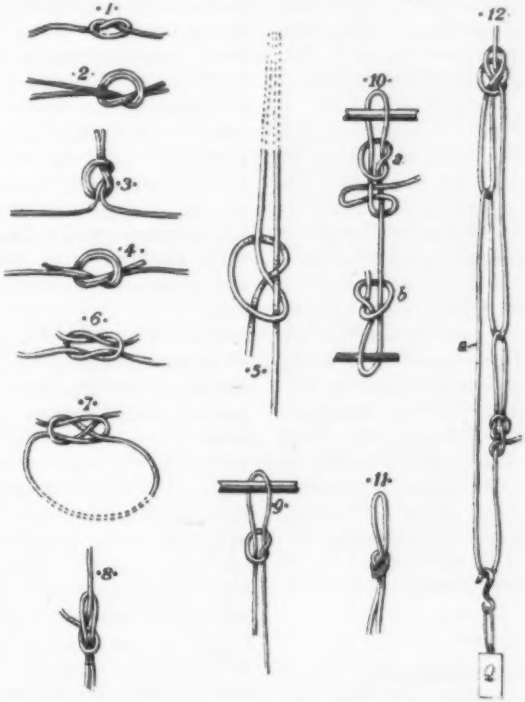
The TEXTILE WORLD asks practical men to contribute articles for this department. We pay for articles accepted. The acceptance depends entirely upon the value of the ideas expressed. We make all necessary revisions, and urge practical men to contribute, regardless of experience in writing for publication. Illustrations add much to the value of an article, and photographs and sketches are desirable. All communications are confidential, and under no consideration is writer's name published or made known without his permission.

## Notes on Knots.

The round knot is either single or double. The single knot (No. 1) is but rarely used, and then is employed for preparing a loop or to hold another knot. The double form (No. 2) joins two ends and is used by weavers in threading shuttles.

In the ordinary knot formed on the finger tips (No. 3) the ends of the threads project in the same direction. This knot, which comes wholly on one side of the thread, is frequently caught by the reed and heddle eye.

In the knot shown at No. 4, the two ends project in different directions, thus distributing the knot more around the thread so that it passes more easily through the heddle eye and reed than the preceding knot; it takes somewhat longer to tie this one.




The two knots (Nos. 3 and 4) are used for splicing warp threads: the first when the yarn is fine and the reed coarse; the second when the yarn is coarse and the reed fine.

When the warp threads are either double or three-ply and one of the single strands break, it is not drawn

through the heddles and reed; it is simply twisted around one of the other strands, as shown at No. 5.

The flat knot shown at No. 6, is used when it is desired to tie two ends which are to be subjected to considerable strain, such as the lacing of jacquard cards.

A weaver's knot is shown at No. 7, and is frequently used in putting new heddles into the jacquard loom and for similar small cords. It is, however, less secure than the preceding one; it is formed by the finger and thumbnails, can be quickly tied, and there is the additional advantage that it can be formed very close to the end of the thread.

The knot shown at Fig. 8 is used more especially to fasten the harnesses. A running knot is shown at No. 9; this is used when it is desired to connect two parts at a variable distance by means of one cord. When the length is determined the cord is fastened by a second knot shown underneath the knot at 10a. Another knot is shown at 10b, which is frequently used in mounting harnesses on silk looms; a two-end knot is shown at No. 11. A knot, called the pulley tackle knot, is shown at No. 12, and is used for the suspension of harnesses, large reeds, etc. This ingenious arrangement enables the position of the suspended body to be easily adjusted. By pulling the end (a) downward the weight (Q) is lowered; and by pulling the end (a) up, this weight is raised.—C. Lebois, in Les Metiers a Tisser le Ruban.

## Silk Finish.

III.

(Continued from July.)

Finishing Material for Taffetas, Foulards, etc. The ingredients are mixed in the following proportions, 2¼ lbs. of gum arabic and 1½ ozs. chloride of tin to each 10 gals. of water. The gum is first dissolved in cold water and the tin then added to the solution. The tin is used for the purpose of giving a scroop to the silk. The goods are impregnated with this mixture and then pressed. If the silks to be treated are black or blue or have been printed with a very dark ground, a more dilute finishing solution should be used in order that the color of the goods may appear brighter. In such a case a mixture made up in the following proportions answers the purpose: 4½ lbs. of rice, 2½ gals. of water, 4½ ozs. white gelatine. The rice is first boiled in water, the gelatine added and the mixture strained.

Amber Finishing Mixture. This is a patented mixture, which increases the elasticity, durability and improves the appearance of silk cloths. Clear transparent amber is dissolved in chloroform in the proportions of 1 oz. of the former to 2 ozs. of the latter. After letting this solution stand for two or three days, the undissolved amber is pressed from the mixture, and the silk goods coated with the residue. The goods are then dried in a room where the evaporated chloroform can be reclaimed. After drying, the cloth is hot pressed. This process is said to make the goods very soft and elastic and to greatly improve the appearance.

Finishing of Half Silk Satins. Most of the finishing of these goods is done during the dyeing operation. While general directions can be given, it must be borne in mind that success cannot be obtained by simply following recipes, but it is essential to have the experience obtained only by long experience in the finishing room. The operations consist of singeing, dressing, calendering, breaking and pressing. The singeing is partially done before dyeing in order to remove the loose fibres from the face of the goods. The operation is conducted on the ordinary singeing machine; the face of the goods passes over a gas flame, the back side of the fabric resting on a pipe which is kept cool by the circulation of water. For dressing the goods tragacanth and glue mixed with a small proportion of finishing oil is used. A very pure grade of glue should be used in order to avoid the

disagreeable odor which is nearly always emitted by the cheaper grades of glue. The quantity of these ingredients depends upon whether a hard or soft "feel" is wanted. The glue and oil increase the lustre. The materials are mixed by boiling together in water and applying to the back side of the goods when cool. The goods are then dried on steam cylinders and wound on rolls. In the application of this dressing care should be taken that none of it is absorbed by the fabric and passes to the face. This can be done by regulating the consistency of the mixture. Calendering, which follows, increases the lustre, particularly of the cotton. The breaking operation is for the purpose of softening the handle of the goods which have been made stiff by dressing and calendering. For this purpose they are run over a roll which is provided with blunt knives running lengthways and in a spiral direction. After this operation the goods are pressed, which completes the finishing process.

Bleaching and Whitening Half Silks. This whitening half silk goods is employed only for such fabrics as are intended for printed designs on a very white ground. The following mixture is employed for this purpose: 20 gals. of water, 18 lbs. of stiffening, 1¼ lbs. gum, ½ lb. of soap and 1¾ ozs. of wax. The soap and wax are first dissolved by boiling in water and the previously dissolved gum is then slowly added. The stiffening is then added while stirring the mixture vigorously. The material is applied to one side of the goods, which are afterwards dried and then pressed. A mixture for dressing both sides of half silk goods is made up as follows: 33 lbs. glue jelly is dissolved in 25 gals. of hot water, 1 lb. of gum tragacanth, 1 lb. of soap and 1 lb. of cocoanut oil is added slowly.—Friedrich Polleyn, in Die Appreturmittel.

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—Promise for a long time, since expectation is more fervent than gratitude.—De la Roche.

### Warping Taffetas.

In manufacturing taffetas great care should be taken to have the warp thoroughly picked so that there may be no lumps, split ends or long knots to cause trouble. Every little unevenness or imperfection in the thread is liable to cause a small float or tight thread in goods made with the taffeta weave; anything of that sort shows plainly in the cloth.

I find that the best way to make perfect cloth is to take great pains in the warping of the yarn; this operation should not be hurried; an extra hour or two spent on a warp will sometimes save days in the weaving. During the warping all the long, split ends and soft places should be taken out. I do not pay so much attention to the small bunches or long knots at this time, but while the warp is being put on the reel the small bunches and long knots can be removed to better advantage.

The beaming should be done very slowly, and it should take one-half as much time to beam the warp as it does to warp it. All lumps and long knots should be cut off and, if any soft places have passed through, the warper should break out the imperfect thread and let a new thread from the bobbin run into the warp until the imperfection has disappeared. All these precautions will well repay for the time they consume. With well made warps a loom running 130 picks per minute will produce in 10 hours from 16 to 18 yards of good cloth with 94 picks per inch.

LEE.

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—The condition of the silk industry in France is reported by the Bulletin De Chambre Syndicale des Tisseurs as being in a deplorable state. The stoppage of machines and the reduction of working time, which began six months ago, still continues and is causing great suffering and destitution among thousands of workers and their families.

### Marking the Width of Ribbons.

Although it is less than 50 years since the first ribbons were manufactured in this country, such rapid progress has been made that, at the present time we look to our own domestic mills for practically all of the ribbons required for use in the United States, with the exception, perhaps, of some of the cheaper grades of velvet ribbons and some high grade novelties in silk and velvet ribbons for the millinery trade.

But the matter to which we wish to refer is that of marking the different widths of ribbons. This is a point which has caused many disputes and misunderstandings among the trade, owing to the fact that there is no generally recognized uniform standard for this numbering. Of course where prices are quoted by "Ligne" (which is equal to 1/11 of an inch) no confusion arises, as then it is a case of actual measurement, and if, for instance, the price be 5 cents per ligne, on say, a 20 ligne ribbon, it is then known at once that the price of the ribbon is $1.00 per piece, or 5 times as many lignes as there are in the width of the ribbon; the price being based, of course, on the number of yards to the piece, the majority of ribbons being put up in 10 yard pieces.

The difficulty arises when prices are quoted by the piece and not by the ligne; values can then only be compared by measuring the widths of the ribbons, as different manufacturers number their goods differently; for instance, one manufacturer's No. 30 ribbon will perhaps measure 38 lignes, while another manufacturer may make a No. 30 to measure only 35 lignes. There are two or three schedules of widths which are perhaps in more general use and better known to the trade than any others. These are known as the "Short or Standard" and the "Long," and sometimes on high grade goods, what is called the "High" schedule.

The accompanying table will illustrate the comparative relations of these different systems.

| No. | Standard. | Long. | High. |
|---|---|---|---|
| 5 | 10 ligne | 11 ligne | 14 ligne |
| 7 | 13 " | 14 " | 15 " |
| 9 | 17 " | 18 " | 19 " |
| 12 | 21 " | 23 " | 24 " |
| 16 | 25 " | 28 " | 30 " |
| 22 | 30 " | 33 " | 35 " |
| 30 | 35 " | 38 " | 40 " |
| 40 | 40 " | 45 " | 48 " |

Thus it may be seen that there is quite a wide range of variation, sometimes as much as 5 to 8 lignes between the widths of goods which are numbered the same, but made by different manufacturers.

If some one uniform schedule could be adopted and brought into general usage, it would be a much desired improvement over the present existing condition.

LIGNE.

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—A process of weighting silk and other fabrics has been patented in Germany, which consists of treating the material with gelatine, glue and albumen or casein, to which formaldehyde as well as a mordant in the shape of uranium, bismuth, lead, tungstate of iron, barium, antimony, tin or iron, as well as soap are added. By repeated treatment without the mordant the weight is increased from 30 to 50 per cent. without injury to the fibre. If a mordant is added it should be used in very small quantities. Formaldehyde, it is claimed, gives lustre and scroop to the silk and adds to its durability.

—A society of Barcelona, Spain, manufacturers have presented a report to the government upon the cause of the present industrial crisis in that country. The depression in the textile branches is ascribed to the loss of the colonies. In 1897, a year previous to the Spanish-American war, the Spanish cotton trade was enjoying a very profitable period. The product of Spanish mills reached nearly 9,000,000 lbs. of cotton cloth. The following year exports shrunk 50 per cent., and this loss of foreign markets has resulted in a glut of the home market.

# POWER DEPARTMENT

The TEXTILE WORLD asks practical men to contribute articles for this department. We pay for articles accepted. The acceptance depends entirely upon the value of the ideas expressed. We make all necessary revisions, and urge practical men to contribute, regardless of experience in writing for publication. Illustrations add much to the value of an article, and photographs and sketches are desirable. All communications are confidential, and under no consideration is writer's name published or made known without his permission.

## Power Transmission.

Before taking up the subject of power transmission by wire cables we wish to call attention to one more example of a hemp rope drive, taken from an iron foundry. The diameter of the driving pulley (a) Fig. 1 is 43 inches; the speed is 200 revolutions per minute. The driven pulley (b) has a diameter of 64 inches; the speed is 150 revolutions per minute; both are provided with two grooves. An endless rope, 1 inch in diameter, runs from the driven pulley to a tension pulley (c) 36 inches in diameter, supported in a frame fastened to the ceiling. From this the rope runs over a carrier pulley (d) back to the driver. Each of the pulleys c and d have but one groove.

If the power is to be transmitted for a distance greater than 65 feet, wire rope is preferable to belting or hemp rope. By employing intermediate stations, power can be transmitted fully 7000 feet. The distance between driver and driven pulleys should not be less than 60, nor over 500 feet in cases where the cable hangs unsupported. For short distances, say between 40 and 60 feet, only small amounts of power can be transmitted by wire cables, as the weight of the cable is

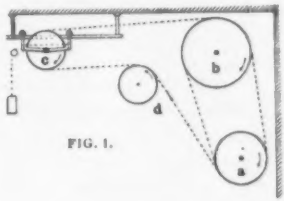


FIG. 1.

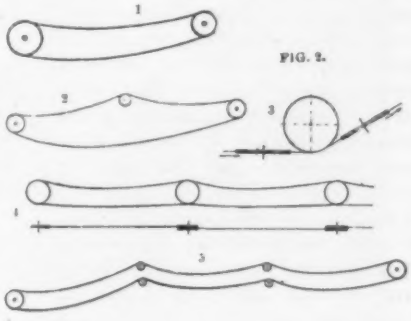


FIG. 2.

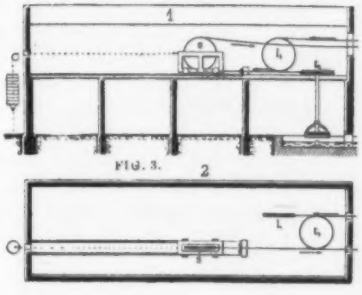


FIG. 3.

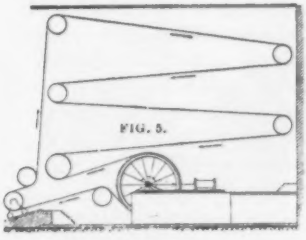


FIG. 5.

FIG. 4.

too small to afford the necessary friction; owing to the lack of elasticity in the cable the necessary friction between the pulley and the cable is obtained wholly by the weight of the upper part of the cable.

The cables for this method of power transmission consist of strands twisted around a hemp core. The single strands are composed of wires likewise twisted around a hemp core, but in the opposite direction. The diameter of the cable varies between ⅜ inch and 1½ inches. For small cables the single wire varies in size between 4/100 and 8/100 of an inch; the number of these used in one cable runs from 36 to 72. It is not possible to use several separate cables on the same puney as in the case of hemp or cotton rope since no two wire cables will have the same tension and, consequently, the strain will come all on one cable; the others will run loose or serve to retard the motion.

Owing to the bend around the pulley the cable is subjected to a very strong strain, and this strain increases as the diameter of the pulley grows smaller. The diameter of pulleys for wire rope should not be less than 150 times the diameter of the cable; whenever possible a larger pulley should be used. It is not advisable to use pulleys less than 40 inches in diameter. Great care should be taken to have the pulleys well balanced and in line with each other. The importance of these two points increases with the speed. The speed of the cable for transmitting small amounts of power varies between 20 and 50 feet, and for large amounts may reach 80 feet per second.

The simplest arrangement for wire rope driving is shown at Fig. 2, No. 1, and can be used in all cases where the distance between the shafts is not too great. The greater the distance between the shafts the higher must they be placed. For long distances supporting rollers are used such as are shown at Fig. 2, Nos. 2 and 5. The division of a long space is preferable to the use of these supporting rolls. This division is effected by using intermediate pulleys each having two grooves. The entire space should be divided up into spaces as near the same length as possible; such a division is shown at Fig. 2, No. 4. By the use of an arrangement shown at Fig. 2, No. 3; wire cables can be used on shafts set at an angle to each other. The objection to this is that three carrier rolls are necessary for each turn.

Many difficulties arise which may be overcome by using one endless cable running from the driver pulley. Fig. 3 shows the sectional and ground plan of a water wheel from which power is transmitted by a wire cable in this manner. The driver pulley t I. is on the wheel shaft itself. The cable runs from this driver over a tension pulley s, and from this pulley is carried to different rooms in the factory. This tension pulley, as shown in the illustration, is set in a frame running on a track and the tension is obtained by means of weights. After passing over the various pulleys in the factory the cable returns over the carrier pulley 1 I. to the driver.

Fig. 4 shows an arrangement for supporting cables carried long distances by which both the driven and driving part of the cable is kept at the same level by having twice as many supporting rolls for the slack part of the cable as are used for the tight part. Fig. 5 shows a method of driving the machine with a wire cable in a factory by means of tension and carrier pulleys.--Uhland's Technische Runschau.

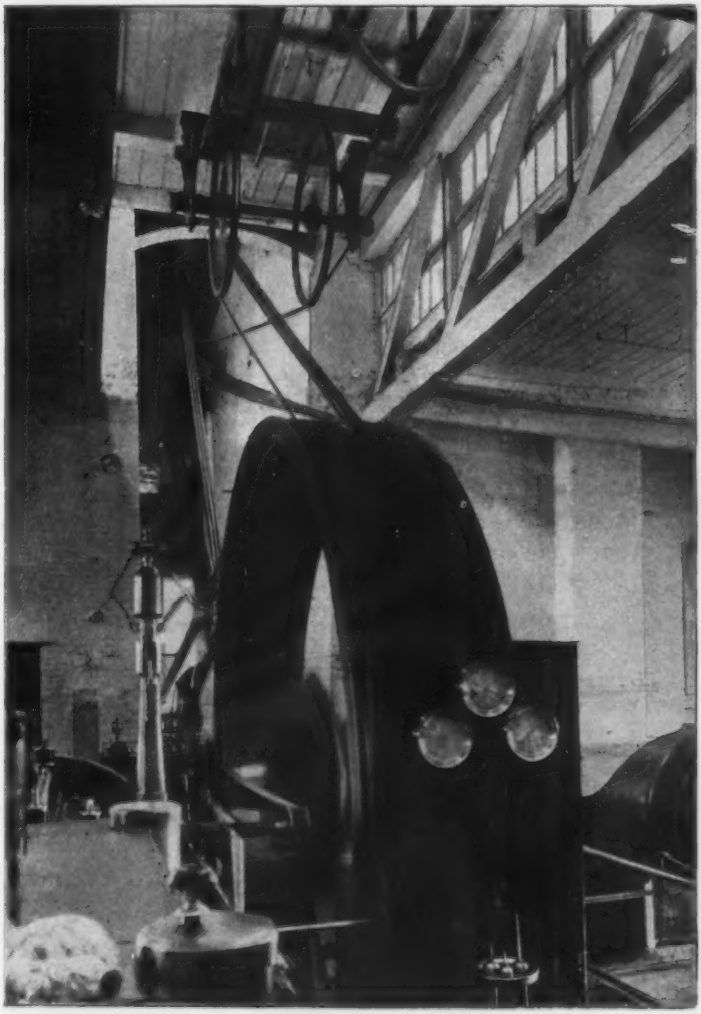
## The Pliability of the American System Rope Transmission.

It is a simple matter to design and erect a mill building large enough to contain the machinery to be used, the difficulty being to get the satisfactory power at each and every machine with but small loss and without too great an original expense and inconvenience in installing power for driving.

A system which is so elastic as to adapt itself to meet any condition and which does not require special cir-

cumstances for its introduction, is a matter of benefit and economy. Benefit on account of the ease with which problems of transmitting power are solved, economy, on account of its cheap first cost, minimum cost of maintenance after installation, and the reduction of frictional losses to the minimum combined with the positive delivery of power to each line shaft.

The pliability of the American system of Manila Rope Transmission is well shown in the accompanying illustrations of interior views in the cotton mill of the Orangeburg Manufacturing Co., of Orangeburg, S. C.,



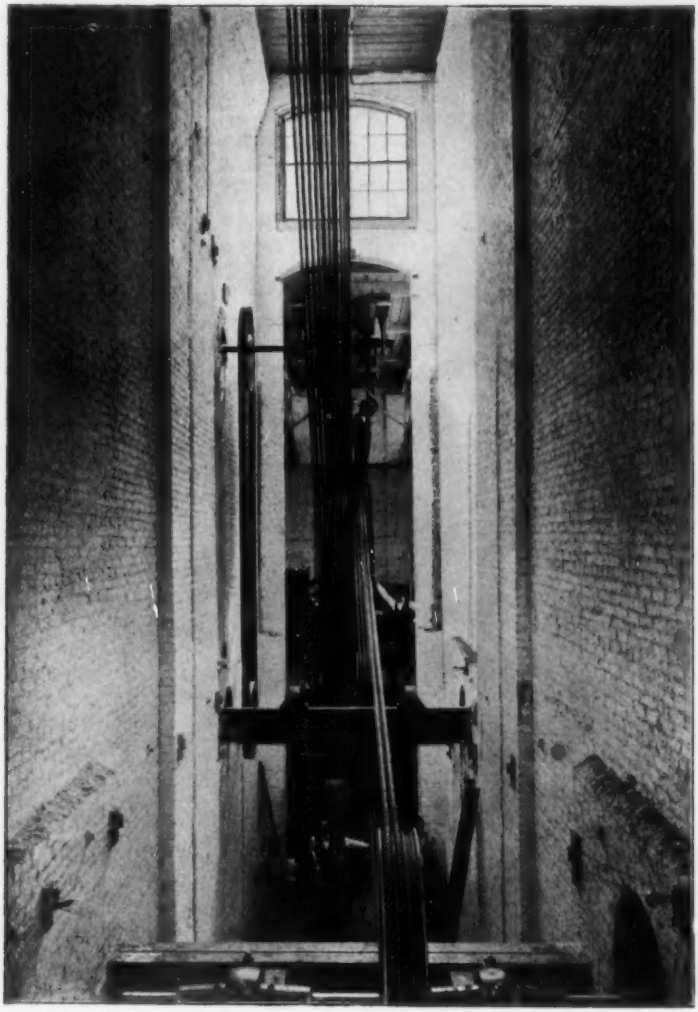
620 h. p. American System Rope Transmission at cotton mill of Orangeburg Manufacturing Co., Orangeburg, S. C. Distributes power to four line shafts in tower and one in basement. View also shows an 18 ft. 16 groove iron center safety wood rim fly wheel.

showing a rope drive as it was designed and installed by the Atlanta Branch of the Dodge Manufacturing Co. in 1900.

As originally laid out another system of rope transmission was to be used in this mill, but the plans were

afterward changed and the American system adopted for the following reasons: The American system did away with the multiplicity of extra sheaves and shafts, it being necessary with the system first adopted to drive from the fly-wheel to main jack shafts, from these jack shafts to auxiliary jack shafts, and from these auxiliary jack shafts again to the driven shafts.

Fig. 1 shows the engine room and the main engine drive taken while in operation. The fly-wheel is a "Dodge" Patent wood rim safety wheel, 18 feet in diameter with sixteen grooves for one and one half inch rope, which, with one continuous rope drives four shafts in the rope tower and a line shaft in the basement beneath the engine room used for operating the pumps, the whole being adjusted with one automatic tension carriage, which is seen immediately above the fly-wheel.



Distribution of power in rope tower to the several line shafts. View looking toward engine fly wheel.

This transmission is distributed as

follows: About 135 h. p. to the shaft driving the lappers and cards; 350 h. p. to the shaft driving spinning and carding machinery; 135 h. p. to each of two lines driving the weave room and machine shop machinery. These shafts are located at varying distances of from twenty-five feet to fifty-six feet from centre of fly-wheel and at different levels, being in three separate stories. Fig. 2 shows a few of these line shafts and is taken in the rope tower looking directly toward the engine room showing the fly-wheel upon engine from opposite side to that in Fig. 1. This view gives an excellent illustration of the difficulties that are easily overcome by the American system of transmitting power by manila rope.

A small "drop-off" rope drive was of six wraps of ⅞ inch rope which distributed 35 h. p. to each of three driven shafts. The first driven shaft is located on centers fourteen feet from the driver; the second driven shaft about ten feet beyond the first; and the third about nine feet from the second. By driving these three lines of shafting with one continuous rope from one common driver, a uniform speed is maintained for each of the driven shafts and the different lines of looms driven from them.

In driving by belting, there is an unavoidable loss in speed between the various shafts and consequently a loss in the production of the looms. The agent of one of the largest mills in the country makes the statement that he has nine lines of shafting driven in this manner by the "Dodge" American system of Rope Transmission and the product from the different lines of looms so driven varies less than one per cent., whereas by his previous system of belt driving the product from the various lines varied very largely, the lines furthest from the driving shaft, showing a very material loss in production.

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—When two persons talk politics, it is not a dialogue; it is two monologues.—Folchetto.

## Cling-Surface at the Buffalo Exposition.

The accompanying illustration is taken from the exhibit of the Cling-Surface Mfg. Co., 146 Virginia St., Buffalo, N. Y., at the Pan-American Exhibition.

This plant was devised and installed by Floy & Carpenter, New York, and is arranged in the most careful way to honestly show ordinary conditions of belt transmission and the possibilities following the use of Cling-Surface, so that almost any variety of comparisons and tests can be made, and also to prove under conditions which may be readily examined and checked off, what Cling-Surface is doing for belts all over the world.

The exhibit is located in the Machinery Building, space 30. It consists of a 10 H. P. Westinghouse Motor from which on a double pulley (one casting) run two 4 inch leather belts, driving two 5 H. P. Westinghouse Generators. These latter are mounted on movable trucks attached to spring balances arranged to show the inital and working tensions on the belts.

The belts are identical, from the same roll of belting as shown by the letter from the Jewell Belting Co.

Cling-Surface Mfg. Co., 146 Virginia St., Buffalo, N. Y.

Gentlemen:—The two 4-inch belts sold to you for the Pan-American Exposition are from the same roll of belting and taken from regular stock. As far as possible they are in all respects identically the same.

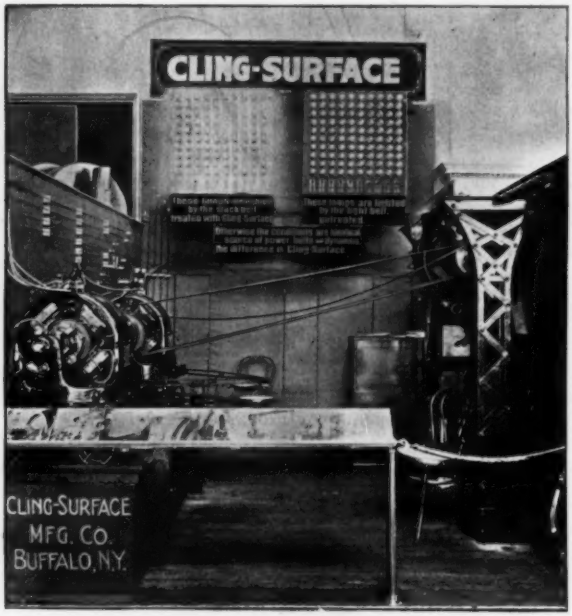
Yours very truly,
Jewell Belting Company.

One is treated with Cling-Surface while the other runs as it came from the maker. The belt treated with Cling-Surface is under an initial tension of 50 lbs. and, when loaded, runs so slack that the top side barely clears the lower or driving side. The untreated belt is under an initial strain of 144 lbs. and runs tight on both sides. With the belts running under the before described conditions and with rheostats equal, the slack belt lights its 100 lamps brilliantly while the tight belt will only light its 100

lamps a faint red. Only 20 lamps can be lighted by the untreated belt to a brilliancy equaling the 100 lamps of the slack belt.

Reducing the initial tension on the treated belt until the two sides of the belt touch makes no variation in the light but does increase the transmitting capacity of the belt, while a reduction of the initial tension on the tight belt instantly shows a corresponding reduction in the light of its lamps.

The delivered power of the treated belt, as shown by voltmeter, averages




110 volts, while the untreated belt, receiving power from the same pulley, delivers from 80 to 90 volts.

The speed of the generators averages 400 revs., when driven by the slack belt and 300 to 330 revs. per min. by the other. An inspection of this plant will repay all users of belts.

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—Modesty is to merit what shadows are to a picture; they add strength to the figures and bring them into relief. —La Brugere.

—There are several stations in Germany where attempts are being made to raise the silkworm. For many years, according to a report from the U. S. Consul at Eibenstock, these experiments have not been attended with much success, owing to the severity of the climate. The question of climate, however, is not so applicable to the worm as to the mulberry leaf, and attempts are being made to discover a successful substitute for this plant. In Sprockhovel, near Barmen, experiments are being made in feeding the worms various kinds of leaves and plants, and, according to reports, the results are quite satisfactory. Thirty-two kinds of plants have already been tested, from 400 to 500 worms subsisting upon each; and in Crefeld, during 1900, 120,000 worms were fed with black hellebore, with the result that a silk fibre was attained, which, however, was greatly inferior in strength and durability to that produced by worms fed upon mulberry leaves.

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—Idleness, like rust, consumes faster than labor wears out.—Anon.

# DYEING DEPARTMENT

## Dye Recipes for August.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $4.

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### Recipe No. 113.

**Blue on Cotton Yarn.**

Dingley Blue B on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Dingley Blue B.

(Schoellkopf, Hartford & Hanna Co., 100 William St., New York.)

20 lbs. Common Salt.

Enter the yarn at 170° F., bring to a boil and dye at that temperature for one hour.

Dingley Blue B possesses all the characteristic properties of the direct cotton colors, and produces full and even shades.

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### Recipe No. 114.

**Brown on Cotton Yarn.**

Royal Brown B on 100 lbs. of cotton yarn.

Prepare the dye bath with

8 lbs. Royal Brown B.

(W. A. Ross & Bros., 11 William St., New York.)

25 lbs. Common Salt.

2 lbs. Sal Soda.

Enter yarn at 170° F., bring to a boil and dye at this temperature for one hour.

Royal Brown B produces an excellent shade of brown and possesses all the characteristics of the direct cotton colors.

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### Recipe No. 115.

**Black on Mercerized Cotton Yarn**

Phenidine Black No. 4 on 100 lbs. of mercerized cotton yarn.

Prepare the dye bath with

4 lbs. Phenidine Black No. 4.

(Sykes & Street, 85 Water St., New York.)

40 lbs. Common Salt.

Enter at 140° F., bring to a boil and dye at this temperature for one hour.

Then top by working for fifteen minutes at 130 F° in a plain bath containing

¼ lb. Methylene Blue 4 B 2 E.

After washing give a light soaping.

Phenidine Black No. 4 possesses all the characteristic properties of the direct cotton colors, has a very high coloring power and goes on the fibre evenly and, when topped with a basic blue such as Methylene Blue 4 B 2 E. gives a very pleasing shade of black.

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### Recipe No. 116.

**Yellow on Cotton Yarn.**

Deathol Yellow on 100 lbs. of cotton yarn.

Prepare the dye bath with

2 lbs. Deathol Yellow.

(F. E. Atteaux & Co., 176 Purchase St., Boston.)

20 lbs. Common Salt.

Enter yarn at 170° F., bring to a boil and dye at this temperature for one hour.

Deathol Yellow possesses all the characteristic qualities of the direct cotton colors, and can be used on union goods.

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### Recipe No. 117.

**Brown on Cotton Yarn.**

Havana Brown T on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Havana Brown T.

(Schoellkopf, Hartford & Hanna Co., 100 William St., New York.)

25 lbs. Common Salt.

Enter the yarn at 170° F., bring to a boil and dye at that temperature for one hour.

Havana Brown T possesses all the characteristics of the direct cotton colors, goes on the fibre evenly, and has a high tinctorial power.

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Recipe No. 118.

**Dark Red on Cotton Yarn.**

Sultan 10 B on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Sultan 10 B.

(Read, Holliday & Sons, Ltd., 7 Platt St., New York.)

15 lbs. Common Salt.

Enter yarn at 180° F., bring to a boil and dye at this temperature for one hour.

Sultan 10 B produces a dark shade of red and possesses all the characteristics of the direct cotton colors.

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Recipe No. 119.

**Moss Green on Cotton Yarn.**

Alizarine Green K N on 100 lbs. of cotton yarn.

Prepare the dye bath with

20 lbs. Alizarine Green K N.

(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

20 lbs. Sodium Sulphide.

40 lbs. Glauber's Salt.

8 lbs. Soda Ash.

Enter the yarn at 140° F., bring almost to the boil and dye at this temperature for one hour.

Then after treat in a fresh bath made up with

2 lbs. Potassium Dichromate.

2 lbs. Copper Sulphate.

4 lbs. Acetic Acid.

for one-half hour at 140°.

Alizarine Green K N gives an excellent and fast shade of green at a low cost.

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Recipe No. 120.

**Peacock Blue on Cotton Yarn**

Methylene Blue 4 B on 100 lbs. of cotton yarn.

First mordant the yarn in a bath containing

6 lbs. Tannin.

Enter at 160° F., work fifteen minutes and allow to steep in the tannin bath several hours, over night if possible.

Then lift from the tannin bath, wring without rinsing, and work for 30 minutes in a cold bath containing

1 lb. Tartar Emetic,

and wash thoroughly.

Then dye in a bath containing

2 lbs. Methylene Blue 4 B.

(Sykes & Street, 85 Water St., New York.)

1 lb. Acetic Acid.

Enter at 100° F., raise slowly to 180° and dye at that temperature for ¾ hour.

Methylene Blue 4 B produces a brilliant shade of Peacock Blue, which possesses all the characteristics of fastness possessed by the Methylene Blue.

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Recipe No. 121.

**Bright Yellow on Worsted Yarn.**

Fulling Yellow P on 100 lbs. of worsted yarn.

Prepare the dye bath with

1 lb. Fulling Yellow P.

(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

4 lbs. Sulphuric Acid.

20 lbs. Glauber's Salt.

Enter the yarn at 180° F., bring to a boil, and dye at this temperature one hour.

Fulling Yellow P gives very bright and clear shades of a marked fastness to light, washing, scouring, and fulling. The bath exhausts readily, and as the color goes on to the fibre slowly there is but little danger of unevenness. It is well adapted for use with other dyestuffs, and can be applied to all classes of wool material.

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Recipe No. 122.

**Blue Black on Cotton Yarn.**

Tetrazode Black P on 100 lbs. of cotton yarn.

Prepare the dye bath with

30 lbs. Common Salt.

and

8 lbs. Tetrazode Black P.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

1 lb. Soda Ash.

dissolved separately.

Enter the yarn at a boil and dye at this temperature for one hour.

Then enter cold into a bath containing

3 lbs. Sodium Nitrite.

9 lbs. Muriatic Acid.

Work well in this bath for fifteen minutes, wash in cold water and enter immediately into a developing bath containing

1 lb. Beta Naphthol, dissolved in as little 90 Tw. Caustic Soda solution as possible.

Work cold in this bath for fifteen minutes, then wash and dry.

Tetrazode Black P when dyed in this manner and developed with Beta Naphthol gives excellent and fast shades of Blue Black.

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Recipe No. 123.

**Red on Cotton Yarn.**

Chlorantine Red 8 B on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Chlorantine Red 8 B.

(A. Klipstein & Co., 122 Pearl St., New York.)

20 lbs. Sodium Chloride.

Enter the yarn at 100° F., bring to a boil and dye at that temperature for one hour.

Chlorantine Red 8 B produces a bluish shade of red, and possesses all the characteristics of the direct colors.

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Recipe No. 124.

**Blue on Cotton Yarn.**

Alizarine Blue D 2 R on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Alizarine Blue D 2 R.

(Victor Koechl & Co., 122 Hudson St., New York.)

15 lbs. Common Salt.

1 lb. Soda Ash.

Enter yarn at 170° F., bring to a boil and dye at this temperature for one hour.

Then work one half hour at a boil in a bath made up with

5 lbs. Solidigen.

(Victor Koechl & Co., 122 Hudson St., New York.)

2 lbs. Muriatic Acid.

Rinse in a bath containing a little soda, and dry.

When dyed in the above manner and after-treated with Solidigen, Alizarine Blue D 2 R produces a comparatively fast and desirable shade of blue.

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Recipe No. 125.

**Blue on Cotton Yarn.**

Congo Fast Blue H W on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Congo Fast Blue H W

(Berlin Aniline Works, 72 Front St., New York.)

25 lbs. Sodium Sulphate.

1 lb. Soda Ash.

Enter at 180°, bring to a boil and dye at that temperature for one hour.

Congo Fast Blue H W produces a pleasing shade of blue, and possesses all the characteristics of the direct cotton colors.

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Recipe No. 126.

**Red on Cotton Yarn.**

Diphenyl Red 8 B on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Diphenyl Red 8 B.

(John J. Keller & Co., 104-106 Murray St., New York.)

20 lbs. Common Salt.

Enter yarn at 180°, bring to a boil and dye at this temperature one hour.

Diphenyl Red produces a fine shade of bluish red, and when used in low percentages produces a very handsome pink.

It possesses all the characteristics of the direct cotton colors, is highly recommended for dyeing union goods, and is not changed by acids or heat.

Recipe No. 127.

**Violet on Worsted Yarn.**

Acid Violet 10 B on 100 lbs. of worsted yarn.

Prepare the dye bath with

2½ lbs. Acid Violet 10 B.

(United Indigo and Chem. Co., 176 Federal St., Boston)

15 lbs. Glauber's Salt.

4 lbs. Sulphuric Acid.

Enter the material at 170° F., bring to a boil and dye at that temperature for one hour.

Acid Violet 10 B is especially suited for the dyeing of dress goods and stands considerable milling and exposure.

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Recipe No. 128.

**Pink on Mercerized Cotton Yarn.**

Rhodamine 6 G on 100 lbs. of mercerized cotton yarn.

First mordant the yarn in a bath containing

6 lbs. Tannin.

Enter at 160° F., work fifteen minutes and allow to steep in the tannin bath several hours, over night if possible.

Then lift from the tannin bath, wring without rinsing, and work for 30 minutes in a cold bath containing

1 lb. Tartar Emetic,

and wash thoroughly.

Then dye in a bath containing

1 lb. Rhodamine 6 G.

(C. Bischoff & Co., 87-89 Park Place, New York.)

1 lb. Acetic Acid.

Enter at 100°, bring slowly to 180° and work at this temperature ¾ hour.

Rhodamine 6 G produces a brilliant and pleasing shade of pink.

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—What is necessary to happiness at the age of twenty? A ray of hope. At forty? A ray of glory. At sixty? A ray of sunlight.—d'Houdetot.

—Gold comes from the miser easier than praise from the envious.—De Sivry.

—Words and flags lead men further than reason and right.—J. Simon.

## The Dyeing and Finishing of Aniline Black Hosiery.

Ever since black cotton hosiery became fashionable, the dyer of this class of goods has had to find something that would take the place of logwood and produce a cheap, fast black.

There are two methods by which this can be done. The first is to dye and then diazotize and develop; this method gives a good black and does not tender the goods. The other is the well known "oxidation aniline black" method which, if properly carried out, gives a good black and has in its favor economy and fastness.

The production of the celebrated Hermsdorf Black served as an incentive to the American hosiery dyer, who, after patient research and experiment, has produced a black which is not surpassed by any of the foreign dyed blacks.

There are many formulas used to produce an aniline black, which are very similar, varied only slightly by the different dyers and according to the different classes of goods dyed.

Some dyers use what is known as the "two run method." that is, they pound in tom-tom, extract, oxidize, age 12 hours and again pound in tom-tom, extract, oxidize and without further ageing chrome and finish. Most dyers use the one run method, which consists of pounding in tom-tom, oxidizing, ageing, chroming and finishing.

Following is a formula for a stock liquor made as follows: 4 parts Bluestone, 3 parts Chlorate Potash, 1 2/10 Sal Ammoniac, 6/10 Verdigris, dissolved together and add to the whole 12 parts Aniline Salts. This liquor should stand 14° T.

Another formula is as follows: 4 parts Bluestone, 3.8 parts Chlorate Potash, 1.3 parts Sal Ammoniac, .6 parts Verdigris, .075 parts Tartaric Acid are mixed together, and 16 parts Aniline Salts are added. This solution should stand at 13½°.

A standard solution should not be

heated above 70° F., as a higher temperature causes premature oxidation, and spoils the preparation; for this reason the dye tanks should be kept in a cool place where they may be well aired; in the summer it is well to place ice around the tanks.

The hosiery to be dyed is usually sent to dye house in lots varying in size from seventy-five to two hundred pounds, according to the capacity of the tom-tom; they are generally on wrong side out so that the pounding will not raise a nap on the face.

The operator puts a batch of goods in tom-tom with enough aniline stock liquor to cover them well; they then are pounded from forty to sixty minutes, raised, and the surplus liquor allowed to drain back into tom-tom some minutes, after which they are taken to the oxidizing room; for extracting many dyers use a common laundry extractor, provided with a copper basket to prevent corrosion; as the liquor is extracted from the goods, it runs into a tub or well and is used again.

The stockings are next oxidized; they are put in the oxidizing cages and run from three to five hours at from 90 to 105° F., until they are a good, dark green; great caution must be used during the process of oxidation, for it is then that the goods are liable to be tendered; should the man in charge allow the oxidizing room to get too warm, the goods will be made tender.

The oxidizing cages are cylindrical in form, twelve feet long by seven feet in diameter, covered with woven wire and are divided by a centre partition. The heat for oxidizing comes from a steam coil and is blown into the cage through the hollow shaft. This shaft is perforated to distribute the heat evenly; these cages are generally run at a speed varying from twelve to fourteen revolutions per minute.

After oxidizing, the stockings are carried to the ageing room, where they are spread out upon the racks for twelve hours; these racks are raised about six inches from the floor and are built with slats set apart so that the air may circulate freely.

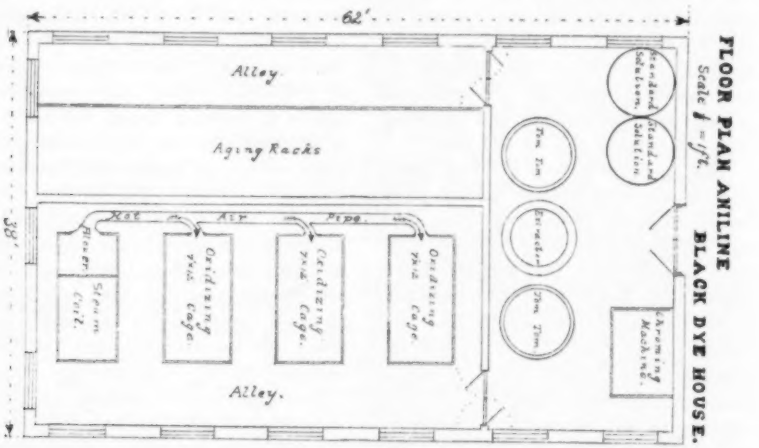
The goods after ageing are chromed with from five to seven per cent. of chrome at 120°-130° F. This operation lasts from thirty to fifty minutes; they then are washed, extracted and sent to the boarding room to be finished. Some dyers use a laundry washer for chroming; others a stocking dyeing machine, or a common dye vat about eight feet long, three feet wide and three feet deep.

If a "lisle finish" is wanted, the stockings are dyed in the usual manner, but with the face side out; they are pounded in tom-tom, extracted, oxidized from five to ten hours, between 90 and 110° F., aged and then chromed in the usual manner.

The object of this lengthy oxidation is to burn all the lint from the face of the stockings and leave a smooth surface; that is the theory, but in practice the whole fabric of the stocking is sometimes burned or tendered; after chroming, the goods are treated to an olive oil emulsion, made as follows: 3.5 parts green olive oil soap, 2. parts olive oil, 1.5 parts hard oil, .2 parts crystals carbonate, 4 gallons water.

The "lisle finish" can be obtained by the singeing method; this is being used by many dyers. The goods are dyed in the usual manner and before chroming are boarded, passed through the flame and brushed; the other side of the stocking is then passed through the flame and brushed; the stockings are then chromed in the usual manner, treated with an olive oil emulsion, extracted, boarded and pressed. It is claimed for this method of finishing that it does not leave the goods tender and that it gives a superior finish; the goods are said to be brighter and clearer; a lengthy description of this method of finishing will be found in the May issue of the Textile World.

The plan here shown in for an aniline black plant consisting of two toms-toms, one extractor, three oxidizing cages, a coil and blower, also an ageing room and chroming machine; this plan does not call for a singeing machine for lisle finish, because the writer thinks that it is better to leave the choice of the method of finishing to each dyer and also because many aniline black dyers do not finish at all.




FLOOR PLAN ANILINE BLACK DYE HOUSE.

This plan also does not show the dyer's office, his experimental laboratory or a drug storage room, because these are generally in main dye house and apart from aniline black plant.

ROGER WILLIAMS.

## The Showerproofing of Textile Fabrics.

(A lecture by Dr. C. O Weber before the Society of Dyers and Colorists.)

For a number of years textile fabrics have been in the market, chiefly for dress purposes, to which by various processes water-repellent properties have been imparted. Until comparatively recently such fabrics have been somewhat vaguely described as showerproof, but at present they are quite commonly, though falsely described as waterproof. This description is misleading, as the same term is used in respect of the india rubber-coated waterproof fabrics, and whereas the latter are undoubtedly permanently and under all conditions waterproof, the former are so to a very limited extent only, for a limited time, and under rather limited conditions only.

This is not due so much to the intrinsic difference of the materials used in the manufacture of india rubber waterproof and showerproof fabrics respectively, as to the essentially different structure of these two classes of fabrics. In india rubber waterproof fabrics there is no water-repelling action intended, or relied upon, the impermeability to water of these fabrics depending upon the impermeability of a continuous film of india rubber. On the other hand, in showerproof fabrics no such film is produced; indeed it should not even be aimed at, as this would destroy their only specific claim by virtue of which, under certain restricted conditions, they possess any tangible advantage as compared with india rubber waterproof fabrics, namely, their porosity, their permeability by air.

This last point, which is always strongly emphasized by the manufacturers of this kind of fabrics, proves, however, at once that owing to this porosity they cannot be waterproof in the strict sense of this word, but only water-repellent. This is borne out by the behavior of these fabrics

on exposure to rain. The latter collects upon them in the spheroidal form, the form adopted by all liquids upon surfaces they cannot wet, but the passing of the water through the pores of the cloth is prevented by the comparatively high surface tension of these water globules. Up to this point these showerproof fabrics behave, therefore, in effect as waterproof fabrics. But if the impact of the falling rain-drops is sufficiently strong, or assisted by a high wind, they are forced through the pores of the fabric, and this almost invariably signalizes the more or less complete breakdown of the waterproof qualities of these fabrics. The same effect is produced by a variety of such mechanical influences as these fabrics are subject to in actual wear, particularly pressure or friction, which press the surface moisture into the fabric, with the result that the rain now passes through with perfect freedom.

This could only be prevented by forming a continuous film upon or in the cloth, but this is not possible with the materials employed for showerproofing, which do not possess sufficient cohesion and elasticity for the purpose. The showerproofing effect is, therefore, arrived at simply by coating or incrustating the threads of the fabrics with some water-repellent substance, but leaving the pores unobstructed.

The processes by means of which this effect has been aimed at are so numerous that a full discussion of them would require a very considerable time. Almost countless is the number of patents taken out for these processes, and there is still a regular perennial crop of them, the same thing being patented over and over again, with no benefit to anybody but the royal exchequer.

The processes employed for showerproofing may be divided into two large classes of processes. In the first of these the fibre is simply impregnated or coated with some water-repellent hydrocarbon, or wax. In the second a deposit of alumina, or of some colloidal aluminum salt, is formed upon the fibre.

The "Cravenette" process is a typical instance of the first-named class of processes. It consists in the treatment of the cloth with a dilute solution of paraffin wax, or similar hydrocarbons, in petroleum spirit, coal tar naphtha, or benzole, and subsequent pressing of the cloth between hot plates. This impregnation of the fibres of the fabric with paraffin wax renders them water-repellent, and the water being no longer able to wet the textile fibre, it assumes at once spheroidal form on coming into contact with it. The surface tension, which is the determining condition of this spheroidal state, is also the force, an elastic stress, counteracting the tendency of the water to pass through the open pores of the cloth. It is, therefore, obvious that any reduction of the size of the pores or meshes of the cloth will tend to increase this effect.

It will be seen from this that this process of showerproofing relies upon the same physical principle upon which depends the possibility of carrying water in a sieve. This very well known lecture experiment is carried out by immersing brass or copper gauze in melted vaseline and allowing subsequently the excess to drain off in a water oven. The extremely fine coating adhering to the wire of the gauze is, of course, water-repellent. Any water poured upon it at once assumes spheroidal form with the result that the passage of the water through the meshes of the gauze is prevented by the force of the surface tension under the influence of which the water acts as if it were enclosed in a very fine bladder of india rubber.

The "Cravenette" process has, of course, found various imitators, but as it is not my intention to criticise the efficiency of the various processes it will suffice if I say that the prin-

ciple involved in these rival processes is exactly the same as that upon which the older process is based, the physical nature of which I have been above discussing at some length.

The second class of showerproofing processes above referred to is very large indeed. Common to all is the attempt to deposit upon the fibre, or to coat or incrustate the fibre with a water-repellent precipitate formed in situ.

The processes belonging to this class, with no notable exception, utilize all either alumina, or aluminium salts, or insoluble soaps in conjunction with a variety of indifferent colloidal precipitates. In every case the effect aimed at depends upon the water-repellent qualities of these precipitates.

The oldest of these processes, which is, however, faithfully every year repatented by somebody or other, consists simply in treating the cloth with a solution of aluminium acetate, passing through wringing rollers and drying upon a tentering machine. At first sight it is very difficult to understand, or even to believe, that a fabric treated in this manner should have any water-repelling properties, but the fact itself is undeniable, although the effect is none too strong. An explanation of this fact is probably to be found in the circumstance that on the tentering machine the aluminium acetate is decomposed into a highly basic aluminium acetate deposit and free acetic acid which is driven off with the water. The water-repellent property would therefore have to be ascribed to the highly basic aluminium acetate rather than to alumina, and I have little doubt that this explanation is substantially correct.

A very great improvement of this process is the conversion of the aluminium acetate into an aluminium soap, preferably an oleate. This is carried out by passing the cloth, after padding it in the solution of aluminium acetate and wringing it, through a soap solution, and subsequently washing and drying it. A variation of this process giving even a better result consists in drying the cloth after padding it in the aluminium acetate and passing it then through a boiling soap solution. Of course, in this case, we obtain a highly basic aluminium soap, but the very small amount of fatty acid combining with the alumina under these conditions appears to be quite sufficient to produce a very highly water-repellent deposit. One considerable advantage of this last form of the process is the circumstance that before the cloth enters the soap bath the aluminium salt has been fixed upon the fibre as the insoluble basic salt. Consequently the soap bath shows no muddiness through aluminium acetate dissolving out of the fibre and forming an insoluble precipitate in the soap bath, which not only leads to considerable waste of valuable material but is also apt to cause irremediable stains in the cloth itself.

The substitution of other aluminium salts, such as alum, aluminium sulphate, or chloride, for the somewhat expensive aluminium acetate has been found to give very unsatisfactory results. All these substitutes, it will be noticed, show only to a very slight degree the tendency of the acetate to form basic salts by their direct hydrolysis in aqueous solution. It would, therefore, appear that the function of the aluminium acetate in this process is far more complex than it appears at first sight.

A further variation of this process consists in forming upon the fibre simultaneously a precipitate of the basic aluminium soap and of some other insoluble and colloidal aluminium salt. As such aluminium silicate has been and is used with very good effect. The aluminium silicate is, of course, used in one solution with the soap.

Numerous attempts have also been made to lay tannic acid under contribution for these processes, and every imaginable kind of tannin material has been tried. Although there could

be no doubt that under certain conditions tannic acid may be a useful adjunct in showerproofing, the results generally obtained were never particularly satisfactory. During the last two years, however, a process has come into prominence which not only gives highly satisfactory results, but which also possesses several advantages of a technical nature over the before-discussed processes.

This process, which is the subject of a number of patents, and which is commercially known as the K. A. process, consists in the preparation of a 3 per cent. solution of aluminium acetate by the interaction of aluminium sulphate and lead acetate in equivalent quantities. To this solution a concentrated solution of tannic acid is added until a permanent precipitate is formed. The actual quantity of tannic acid thus required is very small.

The solution is now ready for use and is employed by passing through it the fabric to be showerproofed, squeezing between rollers, and briskly drying on a suitable machine. To obtain the best result it is desirable to damp the fabric before treating it.

It will be observed that before most other processes the K. A. process is distinguished by its great cheapness and ease of application. It has the further advantage of being much more lasting in its effect than any of the other processes named.

The showerproofing processes above described are the most important types of the processes at present in use, and also of the enormous number of processes proposed at various times. Whether they are also the best processes possible is perhaps a difficult question to answer. But the fact that so far the physical nature of the showerproof effect has been very imperfectly understood makes it highly improbable that any of our present day processes should have attained, or even approximated to, final perfection.

The problem to be solved in showerproofing consists in covering the fibres of the fabrics with an extremely thin but continuous and water-repellent coating. It is quite obvious that crystalloid substances cannot possibly fulfil these conditions, as crystalloid deposits are never continuous, and for this reason we must look to the now very numerous class of colloidal substances to furnish us suitable material for the purpose of showerproofing. All colloids as a class yield under suitable conditions the continuous coatings we require and there are great possibilities contained in the fact that colloids with basic properties form absolutely insoluble colloidal precipitates with colloids possessing acid properties. The K. A. showerproofing process may, indeed, already be looked upon as an application of this principle, the colloidal aluminium hydrate and the colloidal tannic acid forming an insoluble and water-repellent colloidal aluminium tannate.

Nor should it be forgotten that colloids in combining with a number of crystalloid precipitants form not crystalloid, but colloidal precipitates, a fact which enormously enlarges the range of substances to be drawn upon for the purpose of these experiments.

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### Chlorinating of Wool.

The methods of chlorinating wool heretofore used possess the disadvantage of yellowing the fibre. Various methods have been proposed for overcoming this difficulty, such as handling the wool in a strong solution of chloride of tin and muriatic acid or sulphuric acid either in the gaseous form or in solution. Another method consists in the use of peroxide of hydrogen combined with silicate of soda, after which the wool is exposed to the fumes of sulphur. Two simple and practical methods which are said to give good results are as follows:

Hypochloride of lime method: The wool is first immersed in a weak solu-

tion of ammonia; it is then handled for a quarter of an hour in a bath containing from 6 to 10 cu. inches of 22° B. muriatic acid per gallon of water; it is then extracted and without rinsing is handled for half an hour in a cold bath containing from 1½ to 2 ounces of lime per gallon. Wool treated in this way acquires a yellow shade which is removed by treating the material for 20 or 30 minutes at a temperature of 50° C. in a bath containing 10 per cent. of sulphate of soda 36° B., after which the wool is well rinsed. The appearance of the wool is improved by handling it at a temperature of 60° C. in a solution of soap containing ¾ ounce of Marseilles soap per gallon.

Chlorine solution method; Although this method is very little used it gives good results. After the wool has been immersed in ammonia water as by the previous method, it is handled for 30 minutes at the ordinary temperature in a chlorine solution containing from 1 to 3 gallons of chlorine gas per gallon of water; it is then rinsed and soaped as already described. The chlorine solution is made in the usual way, and it should be observed that the temperature at which the water absorbs the greatest quantity of chlorine is 8° C. At this temperature 1 gallon of water will absorb 3 4/100 gallons of chlorine gas.

## Peroxide Bleaching and the Stoving of Woolens.

In bleaching with the peroxides, the coloring matter present in the fibre is decolorized by a process of oxidation with the formation of products usually soluble, and which, in consequence, are entirely removed from the goods. It is easy to see, therefore, that no processes, either involving oxidation or reduction to which the goods may be subsequently subjected, can reproduce the original color.

There are many facts beside the actual production of whites which require consideration when studying the process of peroxide bleaching. The same is equally true of sulphur stoving, but it is not difficult to show that apart from the production of whites the process of stoving is positively objectionable. As is well known, the bleach is not permanent, and—a point which is often overlooked—stoving produces difficulties in the subsequent operation of dyeing. Sulphurous acid is a reducing agent, and it is absolutely necessary to leave some of this agent in the goods if they are to remain white for any length of time. Hence the objectionable smell of stoved goods, and hence the havoc that such goods play in the dyebath.

These drawbacks of the sulphur stove by no means exhaust the list. The effect of peroxide bleaching, apart from the main question of removing the color, is quite of an opposite character. The oxidized coloring matter, being soluble and not necessarily colorless, can be removed by suitable means, such as a subsequent light soaping. The bleach is then permanent, and needs no remnant of the peroxide bath to be left in the fibre, and the goods being practically in their natural state, minus color, can be dyed without any fear of partial oxidation or reduction of the dyestuff. For the same reason, there is no smell in the material. It is, as pure wool should be, quite colorless and odorless.—Jour. Soc. Dyers and Colorist.

—Honor cannot exist where justice is absent.—Cicero.

—We swallow eagerly the lies that flatter us, and sip drop by drop the truth that is bitter.—Rousseau.

—The man who is rarely mistaken in others, is apt to be often mistaken in himself.—Duclos.

—It is from the lips of the charlatan that truth is most quickly recognized by the multitude.—Tournier.

# QUESTIONS AND ANSWERS

**Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.**

**For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc, we will charge the enquirer with the cost of the investigation.**

## Darkening the Colors of Turkish and Persian Rugs.

*Editor Textile World:*

How can I subdue the colors of imported Turkish wool rugs? I have tried various means but the colors run into each other. The colors are so bright that it is desirable to subdue them to make the rugs look old. Bagdad (145.)

Our correspondent might find a 3 or 4 per cent. solution of bichromate of potash or a weak solution of copperas to answer his purpose. The bright colors might also be dulled by brushing the rugs with sawdust which has been previously soaked with a strong solution of copperas. Hemlock saw dust would be the best to use on account of the tannic acid which it contains.

## Duties of Superintendents and Overseers.

*Editor Textile World:*

Will you define the duties of a mill superintendent, and a mill foreman?

Authority (139).

In no two mills is exactly the same authority given to the superintendent. It varies with the size of the mill, the class of goods, and the requirements and temperament of the owner. All the authority is centred primarily in the mill owner himself. In a very small mill this authority can, to a great extent, be exercised by the owner directly without the aid of a superintendent. When the mill becomes too large or for any reason the owner desires to transfer the burden of management to other shoulders, he delegates to another a portion or all of his authority in the mill. In many mills the superintendent is expected to merely overlook the manufacturing operations, and give routine directions in regard to certain well defined matters, referring all other questions as they arise to the owner. Frequently he has no authority to engage or discharge the help. In other mills the owner gives his superintendent greater control, and the latter hires and discharges the help and takes more or less complete management of the mill.

The authority exercised by foremen in the different departments of textile mills also varies widely in different cases, although not to such an extent as with superintendents. The work which superintendents and overseers are requested to perform is not the same in any two mills, varying with the size of the plant, class of goods, and the ability of the individual.

## Books on Bleaching, Dyeing and Finishing.

*Editor Textile World:*

I am employed as overseer in the putting up department of a Dye Works and Bleachery. Can you recommend books on dyeing, bleaching and finishing cotton, silk and half silk goods?

Bleach (142).

We can recommend to our correspondent the Printing of Textile Fabrics by Rothwell, price, $6.50. This book gives an account of various machines used in textile printing, thickeners, mordants and printing of cotton, woolen, silk and half silk goods. Another book which Bleach may find suitable to his wants is the Bleaching of Linen and Cotton Yarn and Fabrics by L. Tailfer, price $5.00. This work is a translation from the French; we consider it specially valuable as it treats the subject from a French standpoint. This book, as its title indicates, only treats of the bleaching processes.

On the subject of dyeing we can recommend either Hummel's Manual of Dyeing, one vol., price, $1.75, or Knecht, Rawson and Loewenthal's Manual of Dyeing, three vols., price, $15. The latter work is very elaborate and treats the subject in a very thorough manner.

## Cotton Waste Yarn.

*Editor Textile World:*

Will you kindly advise us where we can buy cotton waste yarn, like sample enclosed, suitable for making 84 needle half hose. Waste (43).

We believe that the Beacon Manufacturing Co., of which C. E. Riley & Co., 281 Congress St., Boston, are the selling agents, make this yarn. We have seen some that was knit into goods of about this gauge.

## Manufacturing Taffetas.

*Editor Textile World:*

Can you inform me as to the usual method of trimming or picking off the knots on silk which has been dyed and wound? Are they taken off before the warps are made, during the operation or afterwards? Silk Knot (146.)

We have submitted this question to an experienced silk warper and weaver, and his views are embodied in an article which appears in the silk department of this issue, and which we think will give our correspondent the information desired.

## Marketing of Hosiery.

*Editor Textile World:*

I enclose you a sample of ladies' black cotton, 176 needle hose, and another of seamless half hose which we are making in our mill. We find it difficult to market the product at a profit. We calculate the cost of the ladies' hosiery at 70½ cents, and the cost of the half hose at 54 cents per dozen. We cannot obtain more than 68 cents, net, for the first and 52 cents, net, for the second, showing a loss on both grades. We would like to have your opinion as to what would be a fair price for the merchandise.

Overproduction (144)

The conditions which our correspondent describes as existing in his own mill constitutes today the situation in the hosiery business throughout the country; the rapid increase in mills, and their operation night and day, has resulted in a reducion of prices below the cost of manufacturing. We have examined the samples, and referred them to a leading authority in this line, who reports as follows:—The ladies' black cotton, 176 needle, full seamless stocking might be improved by making the foot a little fuller and a higher Lisle finish would also add considerably to its appearance, and undoubtedly to its saldbility. This stocking, according to the sample, weighs 2 pounds, 4 ounces to the dozen, and there should be no difficulty in finding a ready sale for it at 77½ cents, net, in bundles, or 80 cents, net, in one dozen boxes. This stocking could be turned out a little cheaper by making it with the patent toe instead of the looped toe, which should bring the price of production down about 2 cents per dozen. The appearance of these samples might also be improved by having them tied with dark red or black yarn in preference to the pink. The seamless half hose, weighing 1 pound, 4 ounces per dozen, should find a ready market at from 60 cents to 62½ cents, net, in dozen boxes. This number could also be greatly improved by giving it a harder Lisle finish, as there seems to be a demand this season for the higher finished goods.

## New Publications.

Humidity in Cotton Spinning. By Sir Benjamin A. Dobson, C. E., M. I. M. E. Price, $1.50. We have received a copy of the revised and enlarged edition of this work, which was compiled by the late Sir Benj. A. Dobson after exhausted researches as to the effects of humidity on cotton spinning, both from a scientific and so called practical standpoint. The original work has been out of print for some time, and the numerous calls for it from all parts of England have induced W. W. Midgley, F. R. Met. S. to issue another edition, to which he has added chapters, which bring the subject of humidification up to date. Mr. Midgley assisted Sir Benj. A. Dobson in writing the original work, and for that reason is specially well fitted to take charge of a revised and enlarged edition.

In the preface to the new edition the reviser says: "Into this work I entered with enthusiasm, happily uninfluenced by any interest either in any cotton industry or in the manufacture of any of the many kinds of humidifiers which have been inspected. The time and thought given to this object will not, I hope, have been spent in vain, in fact, already it is gratifying to know how extensively the principle of humidifying and ventilating has been adopted, and to hear what satisfactory results have attended its introduction, alike to employers and the employed."

This work will certainly be welcomed by all interested in cotton spinning, as the problems presented in the artificial humidification of air for cotton spinning have by no means been completely solved. This work will be a valuable aid to manufacturers in studying the subject. We can furnish it on receipt of price.

Imperfections in Woolen Goods and their Prevention, by Nicolas Reiser, Director of the Royal Weaving School, Aachen. Illustrated; price $2.50.

We have received a copy of the new edition of this work in which the author treats of the imperfections arising in the various processes of manufacturing woolen goods and the best means of preventing them. Herr Reiser's long and varied experience in both the theory and practice of woolen manufacturing makes him well fitted to handle this subject. Separate chapters are devoted to the faults arising in the various processes. Following is a brief abstract of contents:

Selection and preparation of the raw

material, including scouring, carbonizing, drying and coloring; Carding and Spinning; Fabric Construction; Double, thick, soft and hard threads, knots and bunches; Weaving; Streaks; Imperfect edges; Selvages; Holes and Breaks; Chafed Places; Spots; Fugitive Colors; Off Shades; Tender Goods; Dull Patterns. The work is written in German and can be imported through our office.

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Alteration of Weaves without the Use of Special Threads, by Nicolas Reiser, Director of the Royal Weaving School, Aachen. 305 diagrams; price $2.50. In this work the author describes and illustrates various methods of altering weaves to adopt them to different textures. The division of the work is made systematically so that the reader can refer to any class of weaves desired. The methods are adapted only to high priced goods, as the use of back and filling threads renders rearrangement of weaves unnecessary for cheap fabrics. The work is in German and can be imported through our office.

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Unification of Yarn Numbering, by M. Ferdinand Roy.

We have received a copy of the book giving the entire proceedings of the Paris Congress for Unification of Yarn Numbering. The permanent committee appointed by this Congress desire to circulate this work as widely as possible, and have requested us to announce that copies can be obtained from M. Paul Fleury, 9 Rue d'Uzes, Paris, at 4.50 francs (87c.) each.

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Phenomena of Solutions. By M. V. Thomas; 194 pages; Masson & Co., Paris; price, $1.50. This belongs to the series of scientific hand-books issued by this house. The following abstract of the table of contents will give our readers a good idea of the work. Solubility of solids in liquids; co-efficient of solubility; graphic charts of solubility; solubility of mixtures; supersaturation; heat phenomena accompanying solutions, refrigerating mixtures; fusibility of saline mixtures and alloys; freezing points of solutions; boiling points of solutions; solubility of gas; the law of Van t'Off; hypothesis of d'Arrhenius. It is written in the French language.

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The Detection of Aniline, Alizarines, Wood Colors, Etc. on the Fibre, by Frank I. Horrocks. The Dyer's Trade Publishing Co., Philadelphia. Price $1.50. This work contains a list of the important anilines, alizarines, wood colors, etc., with the effect which various acids and alkalies have upon them on the fibre. With a small quantity of each chemical on hand, the dyer or chemist can, by referring to this book, test any of the colors brought before him. In addition to this list tables of the metric system are added, also tables showing the equivalents of specific gravity in the degrees of Beaume and Twaddell, and thermometric tables. The dyer will find this a useful work.

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The Blue Book Textile Directory, Davidson Publishing Co., N. Y. Price $3.00, traveler's edition $2.50. We have received a copy of this well-known directory, which is compiled with the usual care shown in past years. It includes the cotton, woolen, silk, jute and linen mills, dyers, bleachers, print works, etc. and makes an attractive volume.

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## Business Literature.

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Fire Hose. This is a circular issued by the Boston Belting Co., containing descriptions and illustrations of various kinds of fire hose and fire apparatus manufactured by them.

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Engines. The Buffalo Forge Co., Buffalo, N. Y. This is a catalogue illustrating and describing the various engines manufactured by the Buffalo Forge Co., including also tables of dimensions and powers of high and low pressure engines.

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Rubber Covered Rollers. The Boston Belting Co. has issued a circular under this title in which their rubber covered rollers are described and illustrated.

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Rubber Belting. This is an illustrated circular issued by the Boston Belting Co., 256 Devonshire St., Boston, which contains much valuable information in regard to lacing and splicing belts, and transmission of power.

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—Binder for Color Cards, Farbenfabriken. We have received a binder for the color cards issued by Farbenfabriken; it is a very convenient arrangement for filing these cards for reference. Every dyer should secure one of these binders as it will prove a very useful accessory to their office.

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## New Color Cards.

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New Color Cards, Farbenfabriken. This sample book contains 358 colors on wool, which give a complete synopsis of the dye stuff manufactured by the Farbenfabriken for different branches of wool dyeing. It is very compact and of a convenient size and should be in the possession of every wool dyer.

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Grey to Black Shades on Cotton Yarn with Diamine Colors. Wm. J. Matheson & Co., New York. This is a card containing 200 shades dyed with Diamine Black BH, BO, RO, HW on cotton yarn for the purpose of showing the results obtained with these colors in greys and blacks.

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Katigen Black 2B and Katigen Black 4B, Farbenfabriken. We have received a card showing four samples of cotton yarn colored black with the above named dyes. The chief feature of these two brands is the much more bluish tone than that of the older brands even when dyed direct.

Rhoduline Heliotrope 3 B and Rhoduline Blue R. Farbenfabriken. These two products which have recently been put on the market by the Farbenfabriken, belong to their series of Rhodulines. The 3 B brand is said to possess the same valuable properties as the old B brand. The only difference being that it is bluer in shade. The R brand gives a bright reddish blue hue, and is recommended by the manufacturers for its ability to resist light, alkali, washing, and acids. They are chiefly recommended for printing. These two brands are suited for both oiled and unoiled cotton cloth, also for top dyeing aniline black prints. Good results are secured in dyeing with these colors cotton cloth previously treated with tannic acid, and discharged with caustic soda. The dyed shades cannot be discharged with oxidizing agents nor with sulphite of potassium, but the dyed cotton can be mercerized to good advantage. The manufacturers state that both products are adapted for discharging aniline black, and for printing wool, half wool, silk, half silk, linen, half linen, jute, and ramie.

Benzo Rhoduline Red B and 3 B. Farbenfabriken. The cotton is colored with these dyes at the boil, with the addition of 5 to 15 per cent. Glauber's salt and 1-15 per cent. soda, according to the shade required. Mercerized shades on cotton are colored best at the usual temperature of 140° F. at the most, with the addition of 10 per cent. soap and 5 per cent. Glauber's salt; dark shades at the boil with 10 per cent. Glauber's salt and 10 per cent. soap. The fastness to light of the colors obtained with the B brand are stated as very good, those with the 3B slightly inferior. Both offer a good resistance to alkali, acid and washing, and the fastness to chlorine is very good, particularly the 3 B quality. In consequence of their fastness to washing these colors are well adapted for pinks in fancy woven goods.

## Enlarging their Works.

The Parks & Woolson Machine Co., of Springfield, Vt., have recently acquired the entire plant lately operated by the Caverly-Gould Shoe Co., and having removed the shoe machinery are equipping it with new and up-to-date machinery for the manufacture of their own line of cloth finishing machinery.

This company has, until lately, been especially identified with the woolen and worsted branches of the textile industries, in which their finishing machinery is widely introduced and favorably known throughout the trade. In the last few years this firm has been rapidly developing a large business in cotton finishing machinery, and we understand are now doing a great deal in this department, in addition to their regular lines, which were formerly confined exclusively to woolen and worsted machinery.

The purchase of this plant doubles the size of their works, besides giving them a splendid water power, all of which will enable them to meet promptly the increasing demand for their product.

—California Cotton Mills Co., East Oakland, Cal., of which Mr. Wm. Rutherford is Superintendent, have placed a repeat order for Roving Frames with the Howard & Bullough American Machine Co., Pawtucket, R. I.

## Change of Firm.

George L. Anthony, formerly of Anthony & Kenyon, will conduct a general wool business under the name of George L. Anthony & Co., Room 28, 620 Atlantic Ave., Boston, Mass.

## Noiseless Pinions for the Mint.

The New Process Raw Hide Co., Syracuse, N. Y., has received a contract from the United States Mint at Philadelphia for 6 new process noiseless pinions 16-inch diameter, 6-inch face. These pinions are a part of the equipment of the new mint building, the machinery for which is just being installed. They are to be used for transmitting power from a 50 horsepower motor to a 10 by 9 inch rolling mill and will run 175 revolutions per minute, meshing into a 60-inch iron gear. Six armature pinions were shipped by the company for the same motors a short time ago. They are 12⅝-inch diameter, 4-inch face, and will run at the speed of 525 revolutions per minute. The company has just made a shipment of 24 pinions to the Sao Paulo Lt. & Trac. Co., Sao Paulo, Brazil.

## Dubois Sanitary Fast Black.

One by one we hear of representative hosiery mills adopting A. N. Dubois' Sanitary Fast Black. The latest to contract for this system is the firm of Pilling & Madeley, Philadelphia. Mr. A. N. Dubois, whose address is 2170 Sedgeley Ave., Philadelphia, has recently returned from a Southern trip, where he has been engaged in starting up several Southern mills on his Sanitary Fast Black.

## A Saving of Fuel.

The American Woolen Co. have been so well pleased with the economy, together with the entire absence of repair to the 1500 H. P. Green Economizer they have had at their Washington Mills for several years, that they have decided to extend the use of the apparatus to 4500 H. P. additional boilers there, the contract for which was placed last week with the Boston office of the Green Fuel Economizer Co.

## Duplicate Orders Tell the Story.

Initial orders are usually the result of enterprise on the part of manufacturers. Duplicate orders are usually the result of the merit of the goods. The Stephenson Manufacturing Co., of Albany, N. Y., who have been vigorously pushing the Stephenson Bar Belt Dressing, advise us that they have reached the second stage, and feel that the volume of unsolicited orders that are coming to them indicates

that those who have made a trial of their belt dressing, are well satisfied and have adopted it as a standard article in their plants. Not only has their trade increased at home, but we learn that they are now shipping their dressing into many foreign countries, including England, South America, Australia and Turkey.

## Sale of a Worsted Mill.

The Auburn Worsted Mill, Auburn, Mass., which has been idle several years, has been sold to New York parties, who propose to start it up at once on satinets. The sale was effected through R. B. Denny, 143 Federal St., Boston, who makes a specialty of selling mill property.

## They all Agree to It.

He who takes himself to the shores of Northern New England for a season of rest and recreation, finds many peculiar characteristics unknown to other sections of the country. The climate is ever delightful, the recreations of great variety and the scenic display of a magnificence beyond description. The visitor is delighted with the seclusion which penetrates the region and a most remarkable feature of the New England Coast resorts is that its patronage includes tourists from every state and country as well as from every walk in life. The hotels are without exception commodious and finely appointed hostelries, and nothing remains undone that will add to the comfort of the summer sojourner.

The Boston & Maine Railroad reaches every part of Northern New England and the train facilities it offers to all points includes fast and frequent trains equipped with modern Pullman cars. If you are interested in this region send a two-cent stamp to General Passenger Department (7), Boston & Maine Railroad, Boston, for book on coast resorts.

## H. G. McKerrow Changes Firm Name.

On account of certain litigation which has arisen between Mr. H. G. McKerrow and his former partner, Mr. Thomas A. Leigh of Liverpool, Eng., in connection with the dissolution of the former firm of H. G. McKerrow & Co., which took place in December, 1900, the business is now conducted by Mr. McKerrow, under the firm name of H. G. McKerrow. The former partnership affairs have been placed in the hands of a receiver for the collection of the assets, pending decision of the court on the points in dispute. We understand that Mr. Leigh has had no connection with the firm since December 1st last, and that the receiver has no connection whatever with the present firm. We understand that the volume of business done since December last has been large and profitable. Mr. McKerrow has several very popular cotton machinery and supply accounts, and so far as the trade is concerned, the business continues without interruption.

## Enlargement of Plant.

The Langley Mfg. Co., West Point, Ga., have made rapid strides since they started a year ago, and to meet the increasing demands for their varied line of manufacture they have just installed eleven new looms, making in all 27 and 4 more to be put in. Some are very heavy looms and vary in width from 40 to 96 inches with cam Dobbie and Jaquard attachments.

In addition to the style of goods now being shipped such as lap-robes, portieres, table covers, bleached towels, bath robes and Turkish towels, they are starting on quilts, fancy ducks and all kinds of tapestry and upholstery goods.

Capt. E. Lang, the President, seems to have studied every point necessary and will soon have in full swing the most unique variety mill south of Philadelphia.

## New Southern Office.

Stephen C. Lowe, the American agent for John Hetherington & Sons, Ltd., of Manchester, Eng., has opened a Southern office at Charlotte, N. C., and J. S. Cothran, widely known to the mill trade, has been appointed Southern agent. In addition to the Hetherington machinery, we understand that agencies for other cotton machinery will be taken on, so that a complete equipment can be furnished when desired.

## Air Moisteners.

The American Moistening Co. report the following orders recently received by them for their humidifiers: The Henrietta Mills, Henrietta, N. C.; Gaffney Mfg. Co., Gaffney, S. C.; Itasca Cotton Mills, Itasca, Tex.; James Doak, Jr. & Co., Philadelphia, Pa.; Schwarzenbach, Huber Co., West Hoboken, N. J., and Potomska Mills, New Bedford, Mass.

## Amycolle.

Amycolle is the name of a finishing material for silks, silk and cotton mixture veilings. It gives a stiff, transparent finish and it penetrates and combines with the finish. The manufacturers, the Arabol Mfg. Co., 155 William St., N. Y. City, report quite a demand for the Amycolle also for export.

## Economy in Drying.

Manufacturers are too often inclined to think that economy means low prices. They compare first costs, rather than the ultimate results in comparison with those costs.

A rather striking illustration of economy in drying, both in power saving and efficiency of work is called to our attention in a Woonsocket mill, where a new 30-inch Berry wheel was put in to replace an old installation. Two blowers were run by two 3-inch single belts and one 4-inch double belt, transmitting about 14 horse-power. The new Berry wheel is run by one 3-inch single belt and one 2½-inch single belt, capable of transmitting 5½ horse-power, the difference in horse-power being about 8½. In drying

12 oz. cotton worsteds, the Berry wheel did the work in 18 minutes, which it formerly took from 38 to 40 minutes to do.

## Rushing Sprinkler Work.

The International Sprinkler Co. are going ahead with great vigor and pushing their business all over the East. Over 40 southern mills have been equipped with this system, including such concerns as Richmond Locomotive Works, Richmond, Va., Buffalo Cotton Mills, at Union, S. C. Over $30,000,000 worth of property is now protected by this system. Their Canadian agents, W. J. McGuire & Co., Toronto and Montreal, are actively installing this system throughout Canada, and they are thoroughly equipped in the pipe shop to handle this business.

The New England Agents, The Rhode Island Supply Co., Providence, R. I., are active all over New England and are getting a number of contracts both large and small. The president of this company, Mr. Mills, was for more than ten years the Manager of Crane & Co.'s N. Y. Branch, and is therefore thoroughly experienced. This concern has large and well equipped works at Providence with expert engineers and workmen in charge of the sprinkler business.

The International Sprinkler Co. is demonstrating that its devices, engineering and actual workmanship, are of high standard and equal in every respect to the work done by its competitors. Both the general public and insurance interests now recognize it as an important factor in its field. It has not been intimidated by the suits of the General Fire Extinguisher Co., its principal competitor, for alleged patent infringement. Both the International Company and its agents promptly met the issue squarely by guaranteeing customers from any trouble or expense on this score.

## Nothing Like It.

THE GREATEST THING IN THE WORLD.

The whole of New England and, in fact, the whole world, is talking of the Pan-American Exposition, which opened on May 1 and continues until November 1, 1901. It is by far the most complete and artistic exposition ever gotten up, and everything on exhibition is well worth seeing.

New Englanders will be particularly interested in the Manufactures and Machinery Exhibits, so close is their connection to the interests therein contained, yet the wonderful exhibits in Uncle Sam's three buildings and in the Electricity Building will prove instructive and profitable to every visitor. There is no branch in science or industry that is not represented; neither is there a country in the Western Hemisphere but what has deemed it advisable to exhibit at Buffalo, and you can depend upon it that everything worth showing will be shown.

Buffalo is just the city for a great exposition. Its location is on the shores of Lake Erie, assuring a cool and delightful temperature. Its every street is like a park, and all its environs are conducive of pleasure. A delightful ride of less than an hour takes you to Niagara Falls, which is one of the greatest natural attractions in the world.

The best line to Buffalo from any point in New England is via the Boston and Maine R. R. This route lies through the famed Berkshire and Hoosac valleys, than which there is none more beautiful. The Boston and Maine has arranged for low rates to Buffalo from all points on its line, and if you are going to the great show send to the General Pass. Dept., B. & M. R. R., Boston, for information.

## Percentage of Lactic Acid by Weight and Volume.

Dr. Otto Erberhard writing to the Chemical Journal calls attention to the misleading labels under which solutions of liquids heavier than water are sold in Germany, and cites the case of lactic acid as an instance. Several firms label their lactic acid "50% by volume," in which there is 50 kilo. of acid in each 100 litres. In reality such a mixture contains but 43% of acid by weight. Most buyers consider that such acetic acid branded 50 per cent. strength is one-half pure acid, whereas it contains but 43 per cent. The sale of lactic acid containing 50 kilos. of the pure acid for each 100 litres of the mixture is perfectly justifiable but under no conditions should such a mixture be labeled 50 per cent. acid, as this practice deceives the buyer.

Dr. Eberhard recommends that lactic acid be labeled as follows: 50 weight units of acetic acid in 100 volumes, which could be condensed into the following formula: 50 weight × 100 vol = 43 per cent. by weight.

## Immedial Black NG and NB, W. J. Matheson & Co., N. Y.

This card shows four samples of cotton yarn, dyed with Immedial Black NG and NB, with and without an after treatment of bichrom and acetic acid.

—The Atlas Tack Co., Fairhaven, Mass., have placed a contract for the Green Economizer with H. G. Brinckerhoff, 53 State St., Boston, Mass., the New England representative of the Green Fuel Economizer Co., the sole makers in this country.

—Director C. P. Brooks of the New Bedford Textile School and the American Correspondence School of Textiles, of New Bedford, has returned from Europe where he has spent several weeks in the textile districts of England, France and Germany.

## Erika Pink.

In a recent lecture before the Society of Dyers and Colorists, Edmund Knecht, the well known chemist and dyer, spoke as follows:—

As is well known, the dyestuff known in the trade as Erika B, which was discovered by G. Schultz, is obtained by combining diazotized dehydrothiometaxylidine with alpha naphthol disulphonic

acid (Epsilon acid). As a direct cotton color, Erika met from the commencement with great success, not only on account of its easy application, but also on account of the purity and comparative fastness to light of the shades obtained with it. It is not to be wondered at, therefore, that Erika was not long in taking the place of its rivals—Safflower and the Eosines, while it rendered the application of a beautiful pink available for many purposes for which the dyestuffs existing at the time of its discovery were not suitable.

In spite of its numerous advantages, however, Erika possesses in common with all the direct cotton colors the disadvantage of bleeding, and this occurs as usual more prominently in heavy than in very light shades. Nevertheless, the fault is there, so that for colored figured goods of high quality the ordinary Erika pink is not available. The fastest color for such purposes is still a good Turkey pink. This color is also used, in spite of its high price, for headings in cotton and linen goods which have to undergo the bleaching process. Even Turkey pink, however, is not absolutely fast under these conditions, and sometimes nearly all the color disappears if the bleaching is not carefully carried out.

Being asked some time ago whether it would be possible to produce a faster color than Turkey pink, I thought of producing an unsulphonated Erika on the fibre. The great difficulty, however, in the way of such a procedure was the insolubility of the dehydro base. This was, however, overcome by dissolving in spirit, and pouring into water, when a milky liquid results. The cotton is turned in this for some time in the cold, after which the temperature is raised to the boil and kept at that for an hour. Diazotized, developed in the usual way in beta naphthol, and cleared in a boiling soap bath, a pink results which, though not equalizing Erika B in brilliancy, is, nevertheless, brighter than Turkey pink. As was expected, the color was found not to bleed into the white, nor to lose its strength, on boiling with water or alkali. Interwoven with grey cotton yarn it was put through the ordinary bleaching process (lime acid, ash, bleach, acid), and was found to stand the ordeal in a perfect manner. In fact I thought that I had obtained a pink which would be capable of fairly extensive though special application.

I had almost taken it for granted that the color would stand light at least as well as Erika, but on exposing it was astonished to find that it was one of the loosest colors I had ever tried. Two days' exposure during March was sufficient to completely bleach it. I have brought the matter forward because I considered it interesting from a theoretical point of view. It shows unmistakably the effect of the sulpho groups on the fastness to light of this particular class of color.

## A Remarkable Test.

Users of gears will be interested in the following letter from the Goss Printing Press Co., of Chicago, in which they describe an accident that occurred to one of their presses at the Paris Exposition, caused by the variation of speed and which resulted in the breaking of a cast iron gear, while the rawhide pinion remained uninjured and was used afterwards until the end of the Exposition:

Chicago, May 9th, 1901.

The New Process Raw Hide Co., Syracuse, N. Y.

Gentlemen:—The experience we had with your rawhide pinions last year at the Paris Exposition we presume will be of great interest to you as their performance was a very remarkable one. These pinions were used on an electric motor which operated one of our four deck Straightline Goss Newspaper Perfecting Presses, on which we printed the Daily Paris Edition of the New York "Times."

We were going along smoothly one afternoon, running off the paper in fine shape with a big crowd looking on, and much interested in the work of the press, when all at once, the whole press seemed to take a jump upwards, and we thought the whole machine was broken and disabled. The power was shut off at once and upon examination, we found the teeth of one of the cast iron gear wheels had broken out; these teeth were imbedded in the rawhide pinions. The pinions themselves were not injured except for the iron teeth pounded into them. These we picked out and ran the same pinions and finished not only that day's edition, but they were used till the end of the Exposition and were not worn out then.

We afterward found the cause of the sudden change in speed to be in their changing motors at the power station.

We are pleased to write this very strong endorsement of your New Process Pinions, for we feel that you deserve it.

Very truly yours,

The Goss Printing Press Co.

## Effect of Artificial Manuring on Wool.

Australian contemporaries are discussing what is undoubtedly a very important matter concerning the gradual depletion of the soil of some of its most fertilizing elements by the steady export of wool and meat.

It has been calculated that from 1893-1899 something like twelve and a half million pounds of potash was exported in the form of wool, and seventy million pounds of phosphate of lime taken from the land in the form of meat.

The yolk of the wool is composed to a great extent of soluble potash salts. Where there is an insufficiency of yolk the fibre of the wool is dry, hard, and weak, and the whole of the fleece becomes thin and hairy, whereas with a sufficiency of yolk the wool is soft and oily, rich and strong.

We know by experience in this country that the constant grazing of milch cows quickly exhausts the phosphoric acid salts and potash in the soil, and the only way to keep the meadows in good condition is to return to the soil the constituents taken from it in the form of milk.—Jour. Soc. Chem. Ind.

## Gozoil.

This unique and striking name is that of a new cotton softening preparation, which is being used with much success by cotton finishing establishments and knitting mills. The finishing works speak very highly of it as a splendid softener, never leaving any grease spots on the goods. The Wilmington Oil Co., Wilmington, Del., are the manufacturers.

—The great increase in the sale of steel heddles the past six months has made it necessary for the Steel-Heddle Mfg. Co. to remove to new quarters at 1842-46 Germantown Ave., Philadelphia, where they will have more room.

—The Burt Mfg. Co. of Akron, Ohio, have recently installed several Cross Oil Filters in The New York City public school buildings. Their field is unlimited. They show a saving wherever oil is used for lubrication.

—The knitting mills who are using the new softener, "Gozoil," find that it helps make the work run easily and brings out the colors. The Wilmington Oil Co. at Wilmington, Del., are the manufacturers.

—Noiseless Pinion for Glasgow Exhibition. A New Process noiseless pinion and cut cast iron mate have been recently shipped to Glasgow, Scotland, by the New Process Raw Hide Co., Syracuse, N. Y. They are to be used in connecting an electric motor to a Babcock printing press in use at the Glasgow Exhibition.

# MILL NEWS.

## Cotton.

**New Mills.**

—*Alabama, Alexander City. Work is progressing rapidly on construction of the Alexander City Cotton Mills, the walls of the main building, which will be two stories high, will be completed in a few weeks. About fifteen cottages have been completed for the mill operatives.

—*Alabama, Huntsville. The Eastern Manufacturing Co., with office at 22 Thomas Street, New York City, is name of the new mill to be erected here and in which Chas. L. Poor was reported concerned. The capital stock is placed at $50,000, with Arthur H. Lowe, president, and Chas. L. Poor, treasurer. They will manufacture fine ginghams, operating 200 looms with electric power. A dye house will also be built in connection with the plant, which they contemplate starting about November, 1901. J. Harper Poor and Co. will sell the goods.

—*Alabama, Stevenson. A recent report now states that twenty per cent. of the capital stock has all been paid in for erection of the Broadus Cotton Mills, and work will start at once on construction, the balance to be paid in as work and installation of machinery proceeds.

—*Georgia, Lavonia. Work will soon start on installing the machinery in the Lavonia Cotton Mills, which are expected to be started up this fall. At a meeting recently held by the stockholders, the old officers were re-elected.

—*Georgia, Social Circle. Work has been started toward building the Social Circle Cotton Mills.

—*Illinois. Zion City. The first lace has been made at the Dowie Lace Factory.

—Maine, Portland. The Loray Mills have been incorporated with capital stock of $1,250,000 (part of which has been paid in), to manufacture all kinds of warps, yarns, cloth, print and other fabrics made of cotton and wool. A. M. Lyon, 40 Water Street, Boston, is president of the concern and treasurer. The location of the mill and details have not yet been fully decided upon.

—Massachusetts, Easthampton. Hermann Wolf has started manufacturing suspenders on a small scale, having set up a jacquard loom of special design, at the Easthampton Elastic Web Company's plant.

—*Mississippi, Jackson. Work is progressing rapidly on the construction of the Yazoo City Cotton Mills which have been incorporated with capital stock of $100,000. Machinery will soon be installed.

—*Mississippi, Starkville. The John M. Stone Cotton Mills, which have been organized with capital stock of $125,000 and of which about $100,000 has already been subscribed, propose manufacturing a high grade of cotton yarns and sheetings. They propose purchasing machinery so adapted that a still higher grade of cotton goods can be made without much trouble. This is the enterprise in which Arthur Whittam, formerly of Orangeburg, is interested.

—New York, Jamestown. The old plant on the Hunt road has been secured by Mrs. E. C. Stocker and Mrs. A. J. Gifford, who are equipping same with machinery for manufacturing Turkish toweling.

—*North Carolina, Concord. Operations are being started up in the Gibson Mill, which is equipped with 10,000 spindles and 200 looms for making blankets.

—North Carolina, Graham. The Travora Manufacturing Company has been incorporated with capital stock of $100,000, of which $40,000 has been subscribed. Mrs. Emma V. White, J. Harvey White, Wm. E. White and Edwin M. H. White are the incorporators.

—*South Carolina, Charleston. The corner-stone of the new plant for the Royal Bag & Yarn Co. has been laid and work will be pushed to completion on construction of the buildings.

—*South Carolina, Lancaster. Work is being pushed to completion on the Lancaster Cotton Mills, under management of Col. Springs.

—*South Carolina Newberry. At a recent meeting of the incorporators of the Mollohon Manufacturing Company, George W. Summer was elected president and treasurer; Z. F. Wright, secretary and E. B. Wilbur, general manager and superintendent. This mill will have an equipment of 10,000 spindles.

—*South Carolina, Union. The Aetna Cotton Mills, of which W. H. Sartor is president, have decided to install 300 looms in the plant, which is now under construction, and was originally to have been equipped with but 10,000 spindles. They expect to have the plant ready to start up operations in the fall.

—*South Carolina, Williamston. Work is progressing rapidly on the Williamston Mills, the walls being completed above the second story.

—*South Carolina, Woodruff. The Woodruff Cotton Mills are rapidly nearing completion. The main building is 130x110 feet, four stories high. Equipment will consist of 10,000 spindles and 300 looms. They will make 5.15 goods.

—*Tennessee, Chattanooga. A company will now be formally organized by D. J. Griffin, J. N. Benson, M. M. Hodges and J. F. Casey, for building a mill to manufacture cotton batting. They contemplate letting contracts at an early date for erection of buildings and machinery equipment. This project has been under consideration since February.

—*Texas, Cuero. Work has been somewhat delayed in building the Cuero Cotton Mill and the plant is not expected to be ready before the first of October.

—*Texas Hillsboro. The Hillsboro Cotton Mills, upon which work of construction is being pushed to completion, expect to have the mill ready to start up about the first of November.

—Texas, Wichita Falls. A project is on foot for locating a cotton mill here. The citizens have offered to take $50,000 worth of stock in a $100,000 company, if outside parties can be induced to take a like amount. W. C. Sherrod is interested.

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**Enlargements and Improvements.**

—Georgia, Atlanta. It is reported that the Elizabeth Cotton Mills propose installing looms for manufacture of brown sheetings. This plant now operates 5000 spindles, making hosiery yarns.

—Georgia, Harmony Grove. The Harmony Grove Cotton Mills are to double the capacity of the plant.

—Georgia, High Shoals. The High Shoals Cotton Mills, which have completed the installation of new looms and a dyeing machine, are to erect a large addition to the plant and put in a new water wheel and electric light plant.

—Georgia, Hogansville. The Hogansville Manufacturing Company has decided to double the present capacity of the plant. Additional buildings will be erected and new machinery installed. This plant was recently secured by the United States Cotton Duck Corporation.

—Massachusetts, Ashland. The Olmstead & Tuttle Co., of Chicopee, will start up the Pleasant Street factory in the manufacture of carpet linings. Extensive improvements will be made to the tenements occupied by the operatives.

—*Massachusetts, Easthampton. The machinery is being placed in position in the new dyehouse of the Hampton Company, before the roof is on in order to hasten the work.

—*Massachusetts, Fall River. The Richard Borden Mills advise us that they will erect only a small addition for a weave shed, to take care of surplus yarn.

—*Massachusetts, Lowell. Work has been completed on the erection of the dye house for the Appleton Mills.

—*Mississippi, McComb City. The directors of the McComb City Cotton Mills decided to increase the force of spinners and put on night work to meet the demand for their product. The capital stock was increased $15,000 to meet the expense.

—New York, Valatie. A small brick building is under construction for the Valatie Cotton Mill, W. A. Harder, to be used as a dye house.

—North Carolina, Graham. Additional machinery is to be installed in the Sidney Cotton Mills.

—North Carolina, Shier City. The Hadley People's Manufacturing Company has recently completed installation of additional slubbing and roving frames in their plant.

—Pennsylvania, Philadelphia. John Sidebotham, Frankford, manufacturing cotton tapes and narrow fabrics, has recently completed installation of ten new looms and a bleaching plant.

—Rhode Island, Centreville. The Centreville Cotton Mills are putting in two new horizontal wheels, so as to run by water power when there is plenty of it.

—Rhode Island, Darlington. A new building, 219x114 feet, 4 stories, is under construction for the Phillips Insulated Wire Co. Part of the plant will be two stories and one story, to be utilized for boiler and engine rooms and also for part of the wire-covering machinery.

—Rhode Island, Lonsdale. The Lonsdale Co. is to make large additions and improvements to their plant. The old carpenter shop is to be torn down and a new one, two stories, erected on site of the old picker room. Two additions, 370 by 81 feet and 362 by 66 feet, respectively, are to be made to the bleaching and dyeing plant, in which they will install the largest improved machinery.

—*Rhode Island, Warren. The Warren Manufacturing Company has had ground broken for erection of new building in which they will install additional machinery as per report of June 21st.

—South Carolina, Anderson. The Orr Cotton Mills are installing 1500 additional spindles and 100 looms. It is expected that the newly installed machinery will be ready to run in about two months.

—*South Carolina, Easley. The Easley Cotton Mills have increased their capital stock from $200,000 to $250,000. It is thought that the additional increase will be used for improvements and additions to the plant.

—South Carolina, Clover. At the annual meeting recently held by the directors of the Clover Cotton Manufacturing Company, it was voted to install 2500 additional spindles in the mill.

—*South Carolina, Rock Hill. The Highland Park Mfg. Co. has the full complement of its looms at Mill No. 2 ready for operation. The number, which was formerly 600, has been increased to 786. They have also completed erection of 18 new cottages, replacing 13 burned some time ago.

### Mills Starting Up.

—*Georgia, Columbus. Operations have been started in the new plant of the Columbus Manufacturing Company, about which previous detailed reports have been made. These mills will make brown sheetings for the Export Trade.

—*Georgia, Newnan. The No. 2 mill of the Newnan Cotton Mills has been completed and the machinery put in operation.

—*North Carolina, Salisbury. Operations have been resumed in the Vance Cotton Mills, which were shut down a short time ago on account of "Union labor" difficulties.

—*North Carolina, Wake Forest. Operations have begun in the Royall Cotton Mills. This company makes yarns, operating 5,000 spindles.

—Rhode Island, Providence. The old steam mill on Eddy Street, formerly known as the Nottingham Mill, and Wauregan Mills, will be put in operation sometime during September, by Robert Knight, who recently purchased same from the People's Savings Bank. The mill has an equipment of about 18,000 spindles and 460 looms. Work is now being pushed on the many improvements and additions and installation of additional machinery equipment.

—*Texas, Itasca. The Itasca Cotton Mills have started the manufacture of cloth in the new mill.

—*Virginia, Roanoke. The Roanoke Cotton Mills have begun production of goods.

## Woolen.

### New Mills.

—*Kansas, Topeka. Contract has been let for the erection of the new buildings for the Western Woolen Mill Company, about which a previous detailed report has been made. Work will be started at once on construction.

—Maryland, Hagerstown. Nicholas W. Steele, formerly with the Oakland Manufacturing Company, is interested in project now on foot for forming the Maryland Woolen Company, to take over the property of the old Tyson Flour Mills and erect some new buildings for manufacturing purposes. Two new buildings, 108 by 70 feet and 108 by 58 feet, will probably be erected. The company has been incorporated with capital stock of $250,000. Mr. Steele's name has been previously mentioned in connection with the Powhatan Woolen Company, at Westminster, but which never materialized.

—Massachusetts, Barre. A small plant for making oriental rugs, will be put in operation soon, as the Oriental Rug Works, under charge of L. L. Morrison, conducting a rug and carpet mill at Skowhegan, Me. Many additions and changes will be made to the property recently purchased for the enterprise.

—Massachusetts, Charlton City. The Aldrich Mill Company is a new concern recently formed by Lucien B. Butler, Charles A. Hill and James Heap to manufacture satinets. They will operate the property formerly known as the Copp Mills, which has not been running for some time. Some improvements will be made to the buildings and new machinery installed.

—*Massachusetts, Monson. F. A. Langwald writes us that he contemplates having his new mill for weaving and finishing worsteds, in operation January 1st., 1902. The plant will be known as the Crescent Worsted Mill.

—*Massachusetts, Pittsfield. The project of starting up the Pomeroy Woolen Mill, by the Argyle Woolen Co., formed by Messrs. Graham, Mitchell and McArthur, has been abandoned. Upon making further investigations, they found that considerable new machinery would be required and as the business situation did not warrant their going forward with the enterprise, they took the above measures. Mr. Graham will become associated with Graham, Clark & Co., at Adams.

—New Jersey, Passaic. The Clarendon Wool Company has been incorporated with capital stock of $10,000, to manufacture woolens. Maurice H. and Jacob J. Baumgarten and Arthur B. Spridgen are the incorporators. They will start at once toward erecting a small mill.

—Pennsylvania, Clearfield. James Pontefract, whose mill at Bell's Landing was destroyed by fire in May, contemplates establishing a woolen mill at this place, if the project is favorably supported.

—*Pennsylvania, Indiana. The buildings of the Indiana Woolen Mills are nearly completed. The company expects to have the mill ready to begin operations about the middle of August.

—*Pennsylvania, Philadelphia. Operations have been started in the new carpet mill recently established here by Lyons & Smith. They have purchased the mill formerly operated by George Barber, on Allegheny Avenue. The equipment which at first will be one set cards and two mules on double reel wool yarn, will be increased later.

—Pennsylvania, Waynesboro. The Waynesboro Manufacturing Company has been incorporated with capital stock of $30,000 to manufacture cotton and woolen goods.

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**Enlargements and Improvements.**

—Connecticut, Buckland. The E. E. Hilliard Company has bought the Peter Adams Mills for purpose of acquiring the water privilege to be used in producing electric power to operate the woolen mills.

—Connecticut, South Glastonbury. Work has been started on erecting an addition to Franklin Glazier & Son's dye house.

—Illinois, Jacksonville. An additional set of 60-inch cards, with necessary spinning machinery, is being added to the equipment of J. Capps & Sons' mill.

—*Indiana, La Porte. We have been advised by Samuel Fox's Sons that they are receiving figures on additions to their plant, but have not yet made any definite decision upon the details.

—Maine, Bridgton. The Pondicherry Company has ordered two sets of cards and four 360-spindle mules from the Davis & Furber Machine Co., for installation in their plant.

—Massachusetts, Holyoke. Beebe, Webber & Co. will install 26 additional looms.

—*Minnesota, Albert Lea. The Albert Lea Woolen Mills, which have been purchased recently by Ole Scar, Jno. R. Larson, Jno. Kennedy and Gilbert Nystuen, and are to be removed to Lake Mills, Iowa, will be known as the Lake Mills Woolen Mill Co. They expect to make blankets, flannels, knit and make yarn. Expect to add a dye house.

—*Missouri, St. Louis. Plans and specifications are being prepared for the new buildings to be erected by the Mayfield Woolen Mills Clothing Co., about which mention has been previously made. The main building will be eight stories high and equipped with twenty sets of cards. A. H. Duncan is president; J. D. Simpson; secretary-treasurer and general manager, and A. P. Hudspeth, superintendent of the concern.

—*New York, Malone. J. O. Ballard & Co., reported as having purchased additional mill property and to erect a new building, will start foundations of new structure August 15th. They advise us that they are in the market for large part of the necessary equipment.

—Pennsylvania, Darby. A new improved (Crompton & Knowles) comb has recently been added to the equipment of the Griswold Worsted Company.

—Pennsylvania, Philadelphia. A large three story weave shed, 63x30 feet at the front and 42x166 feet in the rear, will be constructed for William F. Read, manufacturer of silk and woolen dress goods, on 12th. St.

—Pennsylvania, Philadelphia. Extensive enlargements and improvements are being made to Thomas Wolstenholme, Sons & Co.'s worsted plant.

—*Pennsylvania, Philadelphia. Contract has been let by Archibald Holmes & Son for erection of a four-story brick building, 139 by 52 feet, with boiler and engine house, on Allegheny Avenue.

—Rhode Island, Pascoag. A large addition, 150 feet long, and two stories high will be built for the Fred L. Sayles Co.'s plant for a weaving shed; sixty-four new looms have been ordered and will be installed as soon as the building is completed.

—*Virginia, Winchester. The Virginia Woolen Mills are busy installing the eight additional looms previously reported to be added to their present equipment of eight.

—West Virginia, Martinsburg. The Crawford Woolen Company will erect a new building, two stories high to replace wooden structure now on the grounds.

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**Mills Starting Up.**

—*Delaware, Newcastle. It is reported that the Knowles Woolen Mills which have been idle for some time, have been put in operation.

—Massachusetts, Auburn. It is reported that the Stoneville Worsted Mill, which has been idle for over a year, will be started up again by William J. Hogg, making carpet yarns, as soon as the machinery can be put in readiness. The mill will be run to only about half its capacity, at present. Later, new machinery will be added to replace that shipped to Texas, last winter.

—*Massachusetts, Auburn. Operations are expected to start about the first of September in the mill at Pondville, formerly owned by Wilkinson Crossley, but recently purchased by Leopold B. Rosenberg, of New York, who will make satinets.

—*New Hampshire, Hinsdale. It is stated that since a satisfactory settlement of the differences with the heirs of C. J. Amidon, of C. J. Amidon & Sons, that the plant will be put into operation at an early date.

—Massachusetts, West Millbury. Operations were started up in full in the

Ramshorn Woolen Company's mill, which was shut down for two weeks for scarcity of orders.

—Ohio, Difiance. The Nightingale Woolen Mills, which have been shut down recently owing to death of Mr. Nightingale, are expected to start up shortly.

—*Pennsylvania, Philadelphia. Operations have been started up in Albert Herbst & Co.'s new mill, at Emerald Street and Allegheney Avenue. This concern manufactures worsted yarns.

—Pennsylvania, West Conshohocken. Operations may be resumed on August 1st, in the Conshohocken Woolen Mills, which are closed.

## Knit.

**New Mills.**

—*Alabama, Athens. We call attention to name of the new knitting mill at this place, which should have read Limestone Hosiery Co., instead of Lewiston Hosiery Mill.

—*Alabama, Birmingham. The Birmingham Hosiery Mills have been incorporated with capital stock of $5000 to manufacture hosiery and other knit goods. This is the concern previously mentioned using Joseph A. Yates' name.

—*Alabama, Tuscaloosa. Operations have been started in the Rosenau Hosiery Mills. J. W. Sanders is superintendent of the plant, which is equipped with 50 knitting machines for making cotton hosiery. The mill has a capacity of 200 machines. A dye house is also attached to the plant.

—Georgia, Athens. It is reported that Messrs. Collette & Ingall, who are erecting a new building, the first floor of which will be used for a laundry, will equip the second floor with knitting machinery.

—Indiana, Huntingdon. The Huntingdon Knitting Company is a new concern recently organized by Peter Martin, George J. Bippus, A. L. Beck, Charles Arnold, Heber Harter and Gustav Reichelt, with capital stock of $30,000. A new building will be erected, 50x150 feet, brick, to which additions will be made as called for by necessity. The work will be pushed so that operations can be started as soon as possible. Would like to hear from machinery and yarn dealers. They may make fashioned goods on Cotton's patent system, as Mr. Reichelt, the superintendent was formerly with United Knitting Mills at Ft. Wayne.

—Massachusetts, Reading. J. W. Richardson is interested in a project for starting a knitting mill here. Ribbed underwear will be made. We believe the machinery has not yet been entirely arranged for.

—*New York, Little Falls. Porter & Rankin, recently reported as starting a new knitting mill, advise us that in addition to manufacture of ladies' fine jersey underwear, they contemplate making fine mercerized and bleached cotton, jersey underwear, also novelties of various kinds.

—*New York, North Hoosick. Meeker & Link have started operations in their knitting mill recently established here.

—*New York, Sidney. The citizens have been successful in raising a bonus of $3000 for the establishment of a knitting mill and work will be started at once on construction of the new mill. The building will be two stories, 75 by 24 feet, operated by electricity. Joseph H. Clark is at the head of the project.

—*North Carolina, Raleigh. The Raleigh Hosiery Company has now been chartered with capital stock of $75,000. Concern manufactures hosiery.

—New York, Falconer. A small knitting plant is being started on low grade woolen hosiery by H. G. Nutting and Charles Carlson. They are starting with two machines and will run experimentally for a few months. If successful, it will be enlarged.

—New York, Little Falls. Part of the old Stewart Mill, formerly occupied by John McCauley, has been leased by J. M. Rankin, formerly of the Saxony Knitting Mill and J. B. Porter, superintendent of the knitting department of the Victor Knitting Mill, for manufacture of ladies' fine jersey underwear. They will install new machinery, using electricity for motive power.

—*New York, New York. W. W. Beebe is president and treasurer of the Crescent Company, recently incorporated with capital stock of $50,000. They will manufacture high grade sweaters and bathing suits, operating 20 knitting machines.

—*Pennsylvania, Birdsboro. The new knitting mill started in June by Smith & Ross, is equipped with 10 Mayo knitting machines. They make men's half hose, 176 needle goods. Goods are sold direct.

—Pennsylvania, Hawley. A new knitting mill will be established here by Denhardt & Hertler. Work has been started on foundations of the new building to be erected for the purpose. A fine line of sweaters and sporting jackets will be made. New machinery will be installed in the mill, which will start operations with about 20 operatives. The plant will be equipped with nine knitting machines. Goods will be sold direct.

—Pennsylvania, Lyons. A new knitting mill will be established here by Madeira & Warner, who have leased the building formerly used as a carriage shop by H. D. Boyer. They will manufacture hosiery, starting with about 30 people.

—Utah, Salt Lake City. A new knitting mill will shortly be put in operation at 2263 Washington Avenue, by Peter Anderson and Joel Ricks. The estimated cost of plant, including machinery equipment, is about $15,000.

**Enlargements and Improvements.**

—*Georgia, Rossville. We have been advised by the Richmond Hosiery Mills, that they started erection of additional buildings previously and have already completed same. No new knitting machinery has been added, they have only replaced an old engine with a new one and put in automatic sprinklers.

—*Georgia, Tifton. The machinery for the dyeing plant of the Tifton Knitting Mills has been received and is being set up.

—Iowa, Des Moines. The capital stock of the Des Moines Hosiery Mills has been increased from $100,000 to $200,000. About fifty new automatic machines are to be added. Some are being installed. They expect to have the total equipment in operation October 1st.

—*Massachusetts, New Bedford. The new mill to be erected by the Cornell Stocking Company will be 82 by 45 feet, three stories and basement, with dye house attached. Contracts have been placed for most of the supplies.

—*Massachusetts, Wakefield. Work is progressing rapidly on the construction of the addition to the Harvard Knitting Mills.

—*New York, Cohoes. The new building to be erected by the Victor Knitting Mills Company, will be for storage, and not manufacturing purposes as reported.

—New York, Fort Plain. Daniel I. Devoe, manufacturer of infants', children's and ladies' underwear, has purchased a larger building into which he will move his plant. He expects to start operations in new building about the middle of September, or as soon as new machinery can be installed.

—*New York, St. Johnsville. The Royal Knitting Mill Company, which was recently reported having increased the capital stock to $50,000, will erect a new building, 50x150 feet, with an ell, 35x42 feet, for a boiler house. It is expected to have the plant, which will be equipped with the latest improved machinery, ready for operation by October. Electricity will be predominant in the new mill.

—Pennsylvania, Hazleton. Wilde & Co. are considering installing a bleaching plant, and will consider estimates for proper equipment, machinery, tanks, etc., from parties capable of supplying same.

—Pennsylvania, Milton. Machinery is reported being installed in addition built to the West Branch Hosiery Mill and to be operated as a spinning mill in connection with the knitting mill.

—Pennsylvania Spring City. Urner & Co. will build an addition to their large hosiery mill in this city.

—Rhode Island, Woonsocket. Preparations are being made by the Leicester Knitting Mill, Dr. Geo. H. Baker, proprietor, to erect an additional building on Allen Street.

—*Virginia, Danville. The Danville Knitting Mills is busy installing the new machinery and expect to have the whole number of new machines, fifty, in operation September 1st.

—West Virginia, Shepherdstown. The Pennant Knitting Mills of Philadelphia are to remove to this place, where they may enlarge the plant without incurring extra expenses.

## Silk.

**New Mills.**

—New Jersey, Paterson. The Coronet Silk Manufacturing Company has been incorporated with capital stock of $50,000. Wm. J. Orr, one of the incorporators, is the agent of the concern. Wm. W. Uhlinger and Wm. S. Lambert are also interested.

—New Jersey, Paterson. Walker & Leffleaara, a new concern, has recently purchased the throwing plant at Lakeview, formerly owned by P. & J. Bannigan. There are 5,000 spindles in the plant, which will be started as soon as possible.

—New Jersey, Paterson. John Smidt, formerly employed at the Meding Silk Company's mill, has started a small plant for himself in the Murray Mill. He manufactures broad silks.

—*Pennsylvania, Altoona. Operations will soon be started up in the Juniata Throwing Company's plant. This is the mill established here by Francis H. Mayhew of Wortendyke, N. J., who purchased the old silk mill property for throwing purposes. The mill will operate 7,500 spindles, when in full running order.

—*Pennsylvania, Hazleton. The new silk mill has recently been completed, and preparations made for starting same.

—*Pennsylvania, Hollidaysburg. Schwarzenbach, Huber & Co., of Altoona, who recently leased the hosiery mill at this place, for an annex to the mill, expect to start up this week, as work is being pushed on setting up the machinery.

—Pennsylvania, Mauch Chunk. The Board of Trade is considering the establishment of a silk mill at this place. The proprietors propose having a mill about 50 by 100 feet, containing two stories and a basement, and ask for free site, which it is thought will be acted upon favorably.

—Pennsylvania, Pottsville. Operations have been started up in the new velvet mill recently established here by Messrs. Leib & Miller.

—*Rhode Island, Valley Falls. Work has been started on construction of the new silk mill to be stablished here by Reiling, David & Schoen, as per previous reports. The weave shed will be built to accommodate about 600 looms.

**Enlargements and Improvements.**

—Connecticut, Shelton. Contracts have been awarded for the erection of a new building, 125x50 feet, two stories high for the Specialty Weaving Co., manufacturing ribbons. They contemplate having the building completed and ready for occupancy about August 10th.

—Pennsylvania, Danville. An addition, 150 by 50 feet, will be built to the silk mill of which F. Q. Hartman is proprietor. The new building will be utilized for spinning, twisting and winding. Additional spindles will be installed, increasing the number to 50,000.

## Miscellaneous.

**New Mills.**

—*Georgia, Augusta. Nearly all the machinery has been installed in the Clear Water Bleaching & Mfg. Co.'s plant. They contemplate beginning operations in August.

—Minnesota, Minneapolis. A new plant for making embroidery has been started here by John Frueh.

—Connecticut, Shelton. A two-story building, about 25 by 40 feet, is under construction for the Derby Cotton Mills. New addition will be equipped for dye house.

—*Pennsylvania, Hamburg. Operations will soon be started in the new bleachery established here by Scott Fisher. It will be known as the Keystone Bleachery.

—Pennsylvania, Philadelphia. A new concern, known as the Electric Dye Works, has recently been established at 3942 Frankford Avenue, by Charles E. Winsch and Frank W. Janney. They dye and bleach cotton yarn.

—*Rhode Island, Providence. The Roger Williams Finishing Company has been incorporated with capital stock of $100,000 to operate the Allen Print Works, recently secured by William W. Dunnell, who has, associated with him, Frank B. Hodges and E. J. O'Brien. The plant will be thoroughly overhauled and refitted with modern appliances for carrying on the general business of bleaching, dyeing and finishing, of all kinds of goods. This company will have nothing to do with Oriental Print Works, at Appanoag, also secured by Mr. Dunnell.

**Enlargements and Improvements.**

—Connecticut, Jewett City. The Aspinook Company will erect a new dye house, 102 by 162 feet, brick and stone, one story.

—Pennsylvania, Philadelphia. It is reported that Chas. H. Wilson's Sons, Frankford, proprietors of the Meadow Spring Dye & Print Works, with napping and fleecing department at 4153 Frankford Ave., are reported to start up weaving a new carpet similar to Brussels.

## Fires.

—Delaware, Wilmington. The large jute plant, owned by the Planet Company of Brooklyn, N. Y., was damaged by fire recently to the extent of about $4,000.

—Massachusetts, Fall River. The storehouse of the Westport Manufacturing Company, at Westport, was struck by lightning recently, causing loss of about $100,000, to building and contents. It is stated that the loss is fully covered by insurance.

—New Jersey, Elizabeth. The plant of the Standard Rope & Twine Co., at this place, has been destroyed by fire, with estimated loss of $75,000, covered by insurance.

—Ohio, Tiffin. The Tiffin Woolen Mills were badly damage by fire, which started in the picker room. The loss, which is estimated at $2,000, is covered by insurance. This plant was badly damaged by fire last winter.

—Ontario, Elora. The woolen mill at this place, controlled by Messrs. Bain & Co., has been destroyed by fire.

—Pennsylvania, Philadelphia. The carpet yarn mill, operated by John Gardner & Son, was damaged by fire, to the extent of about $2000.

—Pennsylvania, Philadelphia. The warehouse of the National Knitting Works, Jefferson Street, Richard Gutsche, proprietor, has been damaged by fire. The loss on building and stock is estimated at $10,000, partially covered by insurance.

—Pennsylvania, Philadelphia. On Saturday evening, July 27th, the entire mills of Henry Schadewald on Huntingdon St. were destroyed by fire. Most of the made up stock was also ruined. Mr. Schadewald intends to rebuild and re-equip the plant with the latest improved machinery at the earliest possible time.

## Failures and Suspensions.

—Pennsylvania, Philadelphia. The Franklin Hosiery Company, 968 Franklin Street, manufacturing misses' ribbed hose and men's half hose, has been adjudged voluntary bankrupts. The liabilities are estimated at $4,643.80, with assets of $3,416.24.

—*Pennsylvania, Pottsville. The Schuylkill Plush & Silk Mill Company has been declared in bankruptcy. The assets are $46,000, with liabilities of $53,000.

## Facts and Gossip.

—*Alabama, Waynmansville. The case of the Wayman Cotton Mills, involving $60,000, has been settled. John H. Andrews and J. H. Huddleston of Forsyth will have one-half interest, the remaining interest going to the old stockholders, who it is understood paid $7500 to secure this.

—Connecticut, Bridgeport. The Bridgeport Elastic Web Co.'s plant has been recently purchased by the Hub Gore Makers' Co. of Boston. The plant will probably be removed to Boston within a year of the purchase date. This is one of the last of the important web mills to come under the control of the Boston company.

—Delaware, Wilmington. The C. E. Spalding Co. has been incorporated with capital stock of $100,000. They propose manufacturing woolen fabrics.

—Florida, Jacksonville. At a stockholders' meeting of the Jacksonville Knitting Co., the directors' action toward rebuilding of the plant was confirmed. Machinery has been ordered, and every effort will be made to get it in operation as soon as possible.

—Georgia, Athens. Louis B. Magid, formerly of Milford, Mass., is reported as interesting the citizens of this place to establish a silk mill here with capital stock of $150,000. He proposes to take $75,000 worth of stock, if the community will subscribe for the balance. A committee, comprising A. H. Hodgson, W. T. Bryan, H. J. Rowe and H. S. West has been appointed to solicit orders.

—Georgia, Canton. The Canton Cotton Mils have issued $50,000 worth of bonds at per6 cent., payable in five, ten and fifteen years in Atlanta.

—Georgia, Greensboro. We have been advised by J. H. Gheesling, president of the Board of Trade, that nothing definite has been done regarding erection of a knitting mill at tihs place, but that the project is being considered by J. B. Williams and Mayor T. B. Hill.

—*Georgia, Lawrenceville. R. Winn Peoples has been appointed temporary receiver of the Gwinnett Cotton Mills, on account of their failure to meet their July coupons on bonds held as collateral security for a loan by the Maddex-Rucker Banking Company, of Atlanta.

—Georgia, Leesburg. It is reported that Chas. H. Beasley and associates are interested in organizing a company to establish a knitting mill at this place.

—Georgia, Monroe. George Whitney is interested in originating a company to erect a small knitting mill at this place.

—*Illinois, Fairfield. The Fairfield Woolen Mills, which were to have been started some time ago by T. R. Jones, will probably be put in operation soon, as he has made some satisfactory arrangement regarding the question of money, in which he was disappointed by some former associates.

—*Illinois, Lacon. The sale of the ruins and the land upon which the Lacon Woolen Mills stood previous to destruction by fire, has been confirmed by Judge McCulloch. An association of citizens, who will assist John Grieves & Sons is rebuilding the mill, purchased the debris for $3000 and the land for $800.

—*Kentucky, Paducah. The Alden Knitting Mills, will soon be ready to resume operations with full force of operatives. The new building is nearly completed and the fifty additional knitting machines are expected shortly and will be immediately put in position.

—Maine, Gulliford. Charles Dews, agent of the Dews Woolen Co., has sold his interest to J. F. Brallier, who has been superintendent of the Piscataquis Mill. Mr. Dews recently purchased the Ellsworth Mills, and will devote his whole time to that plant hereafter.

—Maine, Portland. The Royalliton Woolen Company has been incorporated with capital stock of $200,000, to manufacture woolen, cotton, linen and other fabrics. Henry L. Cram (Portland) is president and Charles R. Hurd (Milton, Mass.,) treasurer.

—*Maryland, Hagerstown. We have been advised that a movement for starting up a small silk mill by former employees of the Collinge, Nolan & Co., whose plant was destroyed by fire, was talked of, but since there are prospects of the latter concern rebuilding, there has been nothing further done. The concern wishes the town to build a new mill at cost of about $10,000 and present same to them as an inducement to remain.

—*Massachusetts, Blackinton. It is reported that most of the stock in the Blackinton Co.'s mill has been run out and that the mill will be shut down indefinitely. This plant has been in the hands of a receiver for the past three months.

—*Massachusetts, Lawrence. The bankrupt Globe and Prospect Worsted Mills will be sold at auction Thursday, August 22.

—Massachusetts, Lowell. The bill in equity which the Sanford Mill brought against the Massachusetts Mohair Plush Co. has been dismissed by the United States Circuit Court. This was for an alleged infringement of a patent for making frieze plush.

—Massachusetts, Millbury. The Bowden Felt Mills will remove their office in Boston to the mills in Millbury.

—Massachusetts, Palmer. The Grosvenor Woolen Company has been incorporated with capital stock of $20,000, with W. J. Stricho, president and Charles F. Grosvenor, treasurer.

—*Massachusette, Spencer. The Spencer Textile Co., is reported no longer in business. The machinery will probably be removed by Gledhill & Co., Bridgeport, owners.

—*Massachusetts, Wales. L. R. Rosenberg, until recently dealing in wool at 620 Atlantic Ave., oston, has purchased an interest in the Golden Rod Mill, at this place, from J. H. Louden, with whom he will be associated in the operation of the mill.

—*Mississippi, Jackson. The project of establishing a $100,000 cotton mill is again being agitated at this place by Col. J. L. Power. Several efforts previously made have proven failures.

—*Massachusetts, Williamsburg. The sale of the Hampshire Blanket Mills was to be held Friday, August 2. This will be the second attempt to sell these mills. Last week the only bid was for $80,, and as the property is valued at about $12,-000, there was no sale. This plant is operated by steam and water power.

—Missourri, Kansas City. It is reported that a rug factory will be started here by F. M. Sapperfield.

—*New Brunswick, St. John. A decree has been issued for the sale of the Park Cotton Mills. It is not yet known whether a syndicate will be formed to purchase the plant and put same in operation or not, but it is hoped that the mortgagees will buy it and put it in running order.

—New Jersey, Camden. The American Plush-Oleen Company has been incorporated for cleaning, dyeing and renovating plush on car seats, with a cold air process. C. C. Grace is president of the concern; E. J. Townsend, vice-president, and C. Grace, secretary.

—New Jersey, New Jersey. The National Pile Fabric Company, with principal office in the Corporation Trust Company Building, has been incorporated with capital stock of $100,000. They are to manufacture dye and print cotton goods. George J. Fermier, J. N. Atkinson and Thos. G. Haight. This is probably incorporation of the company by same name with plant at Woonsocket, R. I.

—*New Jersey, Paterson. Robert E. Van Hoveburgh, counsel for Murphy Bros., purchased the plant of the Murphy & Isaac Silk Company, at receiver's sale, for $1200.

—New Jersey, Trenton. The Coronet Silk Manufacturing Co. has been incorporated here with a capital stock of $50,-000.

—New York, Albany. A meeting of the American Knit Goods Association was recently held at this place, and quite a large number of mills represented. It was resolved to continue the present schedule of prices and terms under which mills are working, until October 5, and not show samples for 1902 delivery until after another meeting of the Association, to be held on that date. The members present seemed to think that the plan under which they are now working is satisfactory and will continue.

—*New York, Auburn. We have been advised by the Auburn Blanket Company, which was recently formed with capital stock of $10,000, with H. C. Nellis president and manager and Jas. Stern, treasurer, that will add no new machinery to the plant, which is at present equipped with five (5) sets cards and twenty-seven (27) looms.

—New York, Brooklyn. The John Good Jennings Patent Machine Cordage Co. was sold at auction this week to satisfy a claim of over $120,000, held by A. G. Jennings. A. G. Jennings was the only bidder, the property being sold to him for $25,000.

—New York, Cohoes. A meeting was recently held by the stockholders of the Star Knitting Company and the company re-organized. The present officers are: Harriet Bolton, president; John L. Manny (Troy) vice-president; John V. S. Lansing (New York), treasurer and A. I. Whitehouse (Cohoes), secretary .

—*New York, Cohoes. S. E. Clifton & Co., proprietors of the Capital Knitting Mills, recently incorporated and previously reported as contemplating removing, have decided to remain here. Company had considered an offer from Hoosic Falls.

—*New York, Dryden. The Dryden Woolen Mills, formerly owned by J. D. Ross and M. D. Lull, have been sold to W. M. Spiegel, N. D. Doxey and B. F. Levy, of Elmira, who will continue making blankets, etc.

—New York, Elmira. It is reported here that a knitting concern has secured an option on the large factory building at Madison Ave. and East Fifth St. It is understood that they are very likely to locate in this city.

—New York, Falconer. The Chatauqua Worsted Mills and the Falconer Worsted Mills at this place are well employed on orders.

—New York, Fultonville. Efforts are being made by the citizens of this place to secure sufficient funds for purchase of the old broom factory, which they propose giving to Samuel Winters, of Amsterdam, reported as considering inducements to remove his plant.

—New York, New York. The Summit Proofing Company has recently been incorporated with capital stock of $10,000 to manufacture textile fabrics.

—New York, Norfolk. Bennett & Crowley is the firm name under which the Norfolk Woolen Mill will be run in the future, D. Crowley having become Mr. Bennett's partner in the business.

—New York, Philmont. The Summit Knitting Mill property, with exception of some knitting frames and 41 sewing machines, previously sold by the sheriff, were sold by L. Royce Tilden, referee, to Edward F. McCormick, who purchased for Mrs. Charles D. Haines, for $9100.

—*New York, Sidney. Edward P. Ames informs us that although $2,000 has been raised toward the $3,000 essential to locate a knitting mill here, nothing definite has yet been decided.

—New York, Stottville. The woolen mill formerly operated by C. H. & F. H. Stott, has been incorporated under name of the Stott Woolen Co., with capital of $100,000, by Frank L. Stott, Charles H. Stott and John M. Pearson.

—New York, Utica. Negotiations are again under way for the consolidation of the Utica Steam Cotton Mills, and the Mohawk Valley Cotton Mills with a capital stock of $2,000,000. This was talked in January, 1900.

—North Carolina, Charlotte. The Southern Hosiery Yarn Spinners, at a

meeting held recently, adopted resolutions to curtail production during month of August.

—North Carolina, Malee. A project is on foot for establishing a knitting mill. G. C. Baldwin is reported to be interested in the movement.

—North Carolina, Marshall. A project is on foot for erecting a cotton mill in conjunction with the North Carolina Electric & Power Company, which is developing a large water power about 15 miles from Asheville.

—North Carolina, Mountain Island. We understand that the plant of the Mountain Island Cotton Mills is to be sold at auction September 11, by the Fidelity & Deposit Co. of Baltimore, who are the trustees.

—Ontario, Peterborough. The Canadian Cordage & Manufacturing Company is a new concern recently incorporated with purpose of establishing a large plant with capacity of five tons binding twine per day and three tons of rope and cordage per day. They ask the town for inducements, mentioning a request for $4500 with which to purchase land; necessary fire protection, etc. Adam Hall is president of the company.

—Oregon, Brownsville. Hugh Field, C. J. Howe and A. L. Bennett have made a petition to the United States Court, that the Eagle Woolen Mills Company be adjudged bankrupt.

—*Pennsylvania, Chester. The mill mill property of the South Chester Manufacturing Company, sold at auction by William B. Harvey, receiver, was purchased by George M. Booth, representing the First National Bank, for $1,000, subject to a mortgage of $9,500. It is stated that the bank has a purchaser in view, who will operate the plant. The personal property was sold to various parties from surrounding sections.

—Pennsylvania, Fleetwood. It is reported that Daniel Kelchner, proprietor of a creamery at this place, will install knitting machinery on the second floor.

—*Pennsylvania, Lansdale. The Lanza Silk Co. writes us that they have not yet fully decided about removing their plant, but will do so if they find they cannot be successful in securing operatives. Although they purchased ground, when first established for erecting additional buildings, they do not feel justified in building.

—Pennsylvania, Philadelphia. The Hulton Dyeing & Finishing Co. has been incorporated at Dover, Del. It is capitalized at $100,000. This is probably the incorporation of the business of Jas. Hulton & Bro.

—Pennsylvania, Philadelphia. The old established firm of James Martin & Co., which has recently been in the hands of a receiver, will shortly be incorporated with the name of James Martin Company.

—Pennsylvania, Philadelphia. A preliminary organization, preparatory to merging the interests of the upholstering fabrics manufacturers into one corporation, has been formed, with Frank M. Leake, president of the Star & Crescent Mills Company, as chairman of a committee to carry the plan into effect.

—*Pennsylvania, Shippensburg. Frank E. Hollar is now sole owner of the Shippensburg Knitting Mill.

—*Rhode Island, Bristol. A recent report states that the Namquit Mill, of the Richmond Manufacturing Company will continue running, per order countermanding that of previous date regarding closing indefinitely.

—Rhode Island, Woonsocket. The Bernon Knitting Company's small plant, for making ladies' hosiery, has been sold to the E. W. Stiles Knitting Company.

—*Rhode Island, Newport. The plant of the Narragansett Web Co., which was consolidated by the American Tubing & Web Company, of Providence, is gradually being closed up, and removed to Providence. W. C. Perkins is president; L. M. Cook, treasurer; M. H. Cook, secretary, and Alfred Caldwell, general manager of the company, which has been organized and consolidates the Narragansett Web Co., American Tubing & Webbing Co., and The National Elastic Webbing Co.

—*Rhode Island, Shannock. We now learn that it is the Columbia Narrow Fabric Co., of Providence, which will be removed here, to mill owned by Geo. H. Clark, president of the concern.

—South Carolina, Cross Hill. The Cross Hill Mills have been incorporated at this place. J. A. Miller is among interested parties.

—*South Carolina, Fort Mill. We have been advised that it is quite likely that Leroy Springs, who, with E. B. Springs, recently became a stockholder in the Millifort Mill Co., will be president. B. D. Springs is treasurer and Robert Butler, superintendent, acting secretary. This mill has 5420 spindles and 334 looms.

—*South Carolina, Yorkville. S. M. McNeel informs us that the Sutro Cotton Mill will be re-organized at an early date and new machinery installed, sufficient to make a good plan. for manufacturing yarns.

—*Wisconsin, Beloit. The Racine Knitting Co. of Racine, Wis., inform us that there is nothing definite yet in the matter of their removing their plant to this place, as recently reported.

—Wisconsin, Milwaukee. Several of the tow flax companies located in Minnesota and Wisconsin have consolidated under the name of the Union Fibre Co.

# PERSONAL RECORD.

**Cotton.**

—It has been current rumor of late that Edward W. Thomas, so long agent of the Tremont & Suffolk Mills, is about to resign his position to take the general manufacturing management of the cotton duck combination. It wil be a great source of regret to Lowell citizens to have him leave that city, where he has been one of the most popular as well as one of the most successful mill managers.

—J. E. Young, boss carder at the Cherry Cotton Mills, Florence, Ala., has resigned to take a similar place at the Crown Cotton Mills, Dalton, Ga. J. B. Streaker has succeeded him at the Cherry Cotton Mills.

—Benjamin Russell, secondhand of the spinnin room at the Quinebaug Mills, Danielson, Conn., has secured the position of overseer of spinning at the Danielsonville Mills, Danielson, Conn., recently purchased by the Cochrane Mfg. Co.

—Jesse Williams, formerly of the Union Mills, Union, S. C., has been appointed overseer of weaving at the Cabarrus Cotton Mills, Concord, N. C.

—M. G. Stone, who for several months past has been acting as superintendent of the Pacolet Mills of Pacolet, S. C., during the absence of the regular superintendent, has been appointed superintendent of the new Holland Mills of Gainesville, Ga.

—Charles M. Sears, formerly of the Atlantic Cotton Mills, Lawrence, Mass., is the new superintendent at the West Point Mfg. Co., West Point, Ga.

—J. M. Torrence, formerly of the Arlington Mills, Gastonia, N. C., is the new superintendent at the Lowe Cotton Mill, Huntsville, Ala.

—T. Taylor, formerly dyer at the Schofield Mfg. Co., Macon, Ga., is the new boss dyer at the Newman Cotton Mil, Newman, Ga.

—W. H. Willis of Kearney, Neb., has accepted a position with the Overland Cotton Mills, Overland, Colorado.

—T. C. Lane, for many years overseer of carding in Mills Nos. 1 and 2 of D. Trainor & Sons Manufacturing Co., Trainer, Pa., has accepted a similar position with the Hope Mills (N. C.) Manufacturing Company.

—W. E. Poag has severed his connection with the Carolina Mills, Greenville, S. C., to become boss carder and spinner for the Cannon Mfg. Co.'s No. 2 mill, Concord, N. C.

—R. V. Potter, boss spinner for the Courtenay Manufacturing Co., Newry, S. C., has resigned, and is now at the Seneca Cotton Mills, Seneca, S. C.

—John Ormrod, for the past eight years engineer at the Arctic Mills, Riverpoint, R. I., has resigned to take the position of engineer at he Clyde Print Works, that place. Mr. Ormrod will be succeeded at the Arctic Mills by Rhodes Matteson.

—William A. Pickett has been made overseer of weaving at the Eagle & Phenix Mills, Columbus, Ga., succeeding Clyde Boling. Mr. Pickett was previously secondhand in the weaving department.

—D. W. McQwinn has been obliged to resign as overseer of weaving at the Aragon Mills Aragon, Ga., on account of ill health.

—Isaac C. Johnson, overseer of the carding department of the Nashua Manufacturing Co., Nashua, N. H., resigned on Aug. 3d, when the mills closed.

—John Heathercote, overseer of weaving at the Osborn Mill No. 1, Fall River, Mass., has resigned.

—William Halliwell has succeeded William Whittam as superintendent of the Lawton Spinning Co., Woonsocket, R. I.

—Charles W. Holmes, superintendent of the Manchaug (Mass.) Mills, operated by B. B. & R. Knight, has assumed the superintendency also of the Natick (R. I.) Mills operated by the same company. W. M. Spink, who has been superintendent of the latter works for some years, will not altogether give up the duties connected with that position, but advancing age and illness compel him to relinquish them in some part.

—J. F. Fairchild, who was formerly with the Gaffney Mills, Gaffney, S. C., is now overseer of spinning in the Opelika Mills, Opelika, Ala.

—John Greenwood, formerly boss carder at the Magog Cotton Mills, Magog, Can., is now carder at the Aiken Mfg. Co., Bath, S. C.

—Geo. W. Hall has succeeded G. F. Howard as boss spinner at the Warren Mfg. Co., Warrenville, S. C.

—W. P. Knowles has recently been engaged as superintendent of the Hawkinsville Cotton Mill at Hawkinsville Ga. He was formerly at Charlotte, N. C.

—William Ingram has changed from the Elberton Mill, Elberton, Ga., to the Lindale, Ga., mill. He is overseer of weaving.

—William Evans, superintendent of the Richard Borden Mfg. Co., has been elected treasurer of the Wampanoag Mills, Fall River, Mass., to succeed the late Effingham C. Haight. Mr. Evans has been connected with the Richard Borden Mills for a number of years and ranks as one of the most successful superintendents in the city.

—George H. Cook has resigned as superintendent of the Worcester Textile Co., Franklin, Mass.

—Hezekiah Conant, founder of the Conant Thread Co., Pawtucket, R. I., which is now known as the Pawtucket branch of the J. & P. Coats Thread Co., Ltd., has resigned as treasurer and general manager of that concern, and is at present at his summer home at Dudley, Mass., where he was born July 28, 1827.

—J. M. Davis, formerly of the Merrimack Mfg. Co., Huntsville, Ala., has been engaged as boss weaver at the Home Mills, St. Louis, Mo.

—P. J. Cooney, of Manville, R. I., has accepted a position in the Glenlyon Finishing Works, Saylesville, R. I.

—J. C. Ellis, formerly of Philadelphia, is the new boss spinner at the Columbus Mfg. Co., Columbus, Ga., which has recently been started up.

—H. H. Boyd has been engaged as superintendent of the Chadwick Cotton Mfg. Co.'s mill at Charlotte, N. C.

—J. H. Anderson is the superintendent of the new Covington Mills at Covington, Ga.

—W. R. Ennis, of Lancaster, S. C., has been engaged to take charge of the twisting department recently added to the Victor Mills, Charlotte, N. C.

—R. C. Collins, formerly at Greenville, S. C., is now overseer of spinning at the Norris Cotton Mill, Cateechee, S. C.

—Samuel E. Bentley, formerly of Potomska Cotton Mills, New Bedford, Mass., has been elected aent of the Dartmouth Mfg. Corporation, New Bedford. Mr. Bentley was for many years with the Bennington (Vt.) Woolen Mills.

—Harry Crosby, formerly superintendent of the Hadley Thread Company at Holyoke, Mass., has recently been engaged by John C. Meyer & Co., Salem Depot, N. H.

—Edgar R. Eaton, late of Saugus, Mass., is now secondhand of ring spinning with the Otis Co., Ware, Mass.

**Woolen.**

—Peter Scott, who recently resigned his position at Sherbrooke, Que., is now superintendent of the Warren Woolen Co.'s mill at Stafford Springs, Conn.

—Joseph Scout has been engaged as boss spinner at J. Ring & Co.'s woolen yarn mill at Philadelphia, Pa.

—George Smith, Sr., boss spinner, has severed his connection with Talcott Bros., Talcottville, Conn., with whom he has been for the past 27 years.

—Frank Schreibeis is now overseer of carding for Adler & Co., Cincinnati, O.

—George Riddell, for some years employed in the Washington Mills of the American Woolen Company, Lawrence, Mass., as a dresser, has been transferred to the Puritan Woolen Mills of the same company at Plymouth, Mass., where he will have charge of a department.

—James Speed, for several years superintendent of the drawing and spinning departments of the Arlington Mills, Lawrence, Mass., has taken an office at 170 Summer St., Boston, Mass., to deal in worsted and wool yarns and tops.

—William Welch, boss finisher at the mill of the Faulkner Mfg. Co., North Billerica, Mass., has resigned and Alexander Rifenburg has filled the vacancy.

—Joseph Woelfel, for several years past boss dyer and finisher with Jacob Miller & Sons, Philadelphia, is now engaged in a similar position with the Arasapha Mills, Chester, Pa.

—Theodore St. George, boss spinner, formerly with the Talcottville Woolen Mills, Talcottville, Conn., but more recently at the Cleveland Woolen Mills, Cleveland, Tenn., has returned home on account of illness.

—Paul G. Wetstein, Ashaway, R. I., has accepted a position as overseer of weaving with F. Sayles & Co., Pascoag, R. I. Mr. Wetstein had been previously to accepting this position with the Ashaway Worsted Mills since October, 1899. The mills have now run out stock, and will be shut down for an indefinite time. The dyeing, carding, spinning and dressing departments are shut down. Joseph Midgley, boss dyer, has gone to his home in Providence. John Heckle, boss dresser and spooler, has accepted a similar position with the No. 1 mill. Mr. Wetstein was also for ten years overseer of weaving with the Rock Mfg. Co. Rockville, Conn., and had charge of the Merchants Woolen Mills one year.

—T. H. Wilkinson, late of Philadelphia, Pa., has returned to the Mississippi Mills in Wesson, Miss., as superintendent.

—Edward Obershaw is now boss carder at the Reedsburg Woolen Mills, Reedsburg, Wis.

—Benjamin Littlewood, boss dyer for several years at William Wood & Co.'s mill, Philadelphia, Pa., has resigned.

—W. A. Longfellow has been appointed assistant superintendent of the Joslin Mfg. Co.'s merino mill at Olneyville, R. I.

—Adolph Landry has been engaged as night overseer of weaving by Sayles & Gilleran in their worsted mill at Woonsocket, R. I.

—J. S. Murr, late of Trenton, N. J., has accepted the superintendency of the Chambersburg Woolen Co.'s mill at Chambersburg, Pa. This is a five set mill running on ladies' dress goods, cloakings and men's wear.

—D. F. Malone, of Blackstone, Mass., has taken charge of carding at the Saranac Mills, Blackstone, Mass.

—Henry Haigh, for some time past boss carder at the Baltic Mills, Enfield, N. H., has resigned to accept a position in Philadelphia. William E. Orvens, formerly boss carder for the Otrobando Woolen Co., Norwich, Conn., is his successor at the Baltic Mills.

—J. H. Hendry is the new superintendent of the Amos Abbott Company's woolen mills, Dexter, Me. He was formerly superintendent of Andrews & Reddick's mill, Dalton, Mass.

—Thomas Hind is the new boss spinner at the Falconer Worsted Mills, Jamestown, N. Y. Mr. Hind recently came to this country from Bradford, Eng.

—James J. Grady has accepted a position with the Beaver Dam Woolen Mills, Beaver Dam, Wis., as overseer of carding.

—Jacob Hary has succeeded George W. Taylor as superintendent of the mills of the Camden (Me.) Woolen Co.

—George G. Crane, formerly superintendent of the Mount Battie Manufacturing Co., Camden, Me., has returned to that mill in place of W. H. Taylor, resigned.

—Benjamin Broadhead, of the National & Providence Worsted Mills, Olneyville, R. I., has resigned his position as head designer.

—John Campbell has resigned as overseer of weaving at F. L. Sayles & Co.'s mill, Pascoag, R. I., and has associated himself with the firm of Campbell & Henault at Woonsocket. He will take charge of the weaving department of the firm.

—Victor C. Bellan, of Yantic, Conn., has taken charge of carding and spinning for the Charles River Woolen Co., North Bellingham, Mass.

—Charles W. Auel has been engaged as superintendent of the Oneko Mills, New Bedford, Mass.

—D. J. Atwell of Cedar Bluff, Va., has been engaged by A. B. Kesterson, Cumberand Gap, Tenn., as superintendent of his one set woolen mill.

—Edward Slugg has resigned as overseer of finishing room at the Auburn Woolen Co., Auburn, N. Y.

—Daniel H. Daley has resigned as manager and superintendent of the Grove Mill, operated by F. A. Straus & Co., Chester, Pa., owing to ill health, and is to take a trip abroad. A. Foster, formerly superintendent of the Trenton (N. J.) Worsted Mills of the estate of Samuel K. Wilson, succeeds him.

—Albert Davis has resigned as overseer of finishing in the Moosup (Conn.) Mills.

—Ernest Curran, who graduated recently from the Lowell Textile School at Lowell, Mass., has accepted a position in the Arlington Mills, Lawrence, Mass.

—T. F. Burke has resigned as superintendent of the Chambersburg Woolen Co., Chambersburg, Pa. He will become general superintendent of the Tingue Manufacturing Co., Seymour, Conn.

—Thomas Campbell, boss carder in the Ramshon Manufacturing Co.'s mill, West Millbury, Mass., has resigned.

—H. Beaumont is superintendent at the Dalton Woolen Mill, Dalton, Mass., in place of J. H. Hendry, who recently resigned to accept a position in Dexter, Me.

### Knit.

—Joseph Branson is superintendent of the new knitting mill at De Pere, Wis., which is now being set up and will soon be in operation. Five or six knitting machines will be operated at the start.

—George C. Vosburgh, superintendent of the Diana Knitting Mill, Johnstown, N. Y., has resigned.

—Thomas S. Ritchie has been succeeded by John Sherwood as overseer of carding in the mill of the Paragon Knitting Co., Mohawk, N. Y.

—Charles Wolford, recently with the Victor Knitting Mills Company, Cohoes, N. Y., has accepted a position at the underwear factory of A. H. & C. B. Ailing, Derby, Conn.

—Gustav Reichelt, Fort Wayne, Ind., is the superintendent of the new Huntington Knitting Mill Co., at Huntington, Ind.

—Joseph LaGess is now overseer of carding at the Lakeside Knitting Co., Michigan City, Ind.

—Joseph Moore, overseer of carding in the Dingley Mills, Philadelphia, has accepted a similar position at Little Falls, N. Y., in Robert MacKinnon's Knitting Mills, succeeding James J. Grady.

—W. M. Howard has resigned as general manager of the Oxford Knitting Mills, Barnesville, Ga.

—William M. Harding, overseer of carding at the Knoted Silk Underwear Co.'s mill at Millbury, Mass., has resigned, and is now at Readville, Mass.

—David Keefe has resigned as overseer of carding in the Riverside Knitting Mills, Cohoes, N. Y., to accept a similar position with the Victor Knitting Mills Co. of the same city.

—E. L. Holland is the superintendent at the new Talladega (Ala.) Hosiery Mills. He was formerly superintendent of the Chicago Rockford Hosiery Co., Kenosha, Wis.

—C. E. Hams, late of Philadelphia, has recently secured a position in Elmira, N. Y.

—H. F. B. Booth, formerly superintendent of mills at Barnesville and Griffin, has succeeded Peter Harris, Jr., as superintendent of the Wahneta Knitting Mills, Cedartown, Ga.

—W. H. Brayton, formerly of Brooklyn, N. Y., has been appointed superintendent of the Griffin (Ga.) Knitting Mills, which have been shut down for several weeks, and will start up as soon as the machinery is put in order.

—William H. Currie, formerly knitting mill superintendent at Plainville, Conn., and Portsmouth, Va., has accepted a position in Troy, N. Y.

—George E. Davidson of Elyria, Ohio, has recently accepted the position of boss knitter with the United Knitting Mills, Fort Wayne, Ind.

### Deaths.

—William H. Pepper, one of the leading business men of Laconia, N. H., and widely known throughout the knitting industry, died July 18, at his home in Lakeport, after a long illness, at the age of 71 years. He was born in Nottingham, Eng., coming to this country in early boyhood. As a young man, he was practically familiar with the knitting business, then in its infancy in this country, and in 1857 went to Lake Village, as Lakeport was then known, to accept the position of superintendent of the Appleton Hosiery Mills. This position he afterwards resigned to engage in the manufacture of hosiery on his own account with his brother. Later he associated himself with John S. Crane in the manufacture of hosiery knitting machinery, and after several changes the firm of W.

H. Pepper & Co. was formed, and was widely known in connection with their special line of machinery. The business of the firm was incorporated in 1890 under the name of the Pepper Manufacturing Co., in which Mr. Pepper maintained an active interest up to the time of his death. He has been director of the Lake Village Savings Bank and of the Lakeport National Bank, and represented the old town of Guilford in the New Hampshire Legislature in 1890 and 1891, and also held a number of town offices. His loss will be deeply mourned in his native town, and the knitting industry has lost one of the representative men connected with it, although the name is still perpetuated in the company which he founded.

—William S. Spofford, senior member of the firm of Wm. S. Spofford & Son, tube makers and manufacturers of spindles for worsted spinners, died very suddenly at his home in Providence, R. I., on July 4. Mr. Spofford was born in Leeds, Eng., in 1844, where he learned the trade of mill machinist, which he followed for a few years in some of the leading English worsted mills, and after coming to this country in the early sixties, in Providence and Utica, N. Y., mills. He made a study of worsted twisting and spinning spindles, and started a small factory of his own in Providence for their manufacture. Mr. Spofford was a Mason, a member of Saquoit Lodge of Utica, N. Y., aso a member of the Royal Arcanum. A widow and four daughters survive him.

—Effingham C. Haight, treasurer of the Wampanoag Mills, Fall River, Mass., died at an early hour in the morning of July 18 at his summer home in Tiverton, R. I., after a number of weeks of serious illness. Mr. Haight was 45 years of age, and for the larger part of his business life had been connected with local corporations, 24 years of the time having been given to the service of the Wampanoag Mills. He began first as bookkeeper of these mills, and held this position for 14 years. On June 30, 1891, he was elected treasurer, and held this office until his death.

—Robert Simon, senior member of the firm of R. & H. Simon, silk manufacturers, with mills in Easton, Pa., and Union Hill, N. J., died July 26th at a health resort in Germany.

—William Henry Tilton, aged 50 years, died recently. Mr. Tilton was agent of the Sawyer Woolen Mill of Dover, N. H., for twenty-six years. He leaves a wife, two sons and a daughter.

—Morris Mark, president of the Mark Mfg. Co., Herkimer, N. Y., died recently. He had been ill for the past three years, as the result of a stroke of paralysis. Mr. Mark was born in Germany in 1843, and came to America in 1860. He was very prosperous in business, and was considered one of the wealthiest men in this section, and in his death, Herkimer has lost a citizen whose place it will be hard to fill. For years he has been in the knit goods business and besides furnishing employment to hundreds of persons in his large manufacturing establishment, assisted in developing the town by building a large number of dwellings, and his public spirit was manifest in many ways.

—I. E. Glenny of the cotton firm of I. E. Glenny & Co., of New Orleans, La., died July 5 in that city. He was well known among cotton and financial men of New Orleans. The firm is one of the leading cotton concerns in New Orleans.

—Thomas L. Leedom, one of the pioneers in the ingrain carpet trade, died at Lansdown, Pa., July 20th. He engaged in the carpet business in Philadelphia in 1865, and being forced to find a larger mill, moved to Bristol, Pa., in 1886. A widow, a son and a daughter survive.

—Oscar Holway, president of the Old Town (Me.) Woolen Company, died last month at his home in Augusta, Me. He was also president of the Oscar Holway Co., for many years a director in the First National Bank of Augusta, and had been its president since August, 1892, as well as a trustee of the Kennebec Savings Bank, a director in the Auburn Trust Company, in the Kennebec Steamboat Company, Augusta Water Company, Waverly Woolen Company at Pittsfield, and of the Dexter & Newport Railroad Company. He leaves a widow and two sons.

—Henry Whitman, a prominent wool merchant of Boston and senior member of the firm of Whitman, Farnsworth & Thayer, died at his summer residence, Beverly Farms, as the result of a stroke of paralysis. He was born August 5, 1839, in New Brunswick. The deceased was a director in the Webster National Bank of Boston, and belonged to a number of clubs.

—Frederick Wink, well known as a manufacturer of men's wear, being proprietor of the Clifton Mills, Kensington, Philadelphia, died at Fort Washington, Pa., July 13. Mr. Wink was born in Elberfeld, Germany. Previously to his engaging in the manufacture of cloth, he was a designer with Thomas A. Dolan, and later with the late Martin Lanenberger.

—Herbert F. Palmer died suddenly last month. He was prominently connected with the cotton thread industry in its early days. He was, until the concern was absorbed by the American Thread Company, New York agent for the Merrick Thread Company. At that time he retired from business.

—William B. Roe, well known in woolen trade circles, died early last month. Mr. Roe came to this country from England in 1865. He spent four years, from 1868 to 1872, as proprietor of a general store in California. In the latter year, he returned to New York and established a woolen importing business in his own name, his headquarters at the time of his death being at 244 Fifth Avenue. He spent much time in the West and in England, making a trip to California and across the Atlantic at least as often as once a year. He was much respected in his business and social life.

—John Warner, who was known in cotton manufacturing circles as the superintendent of the Coventry Mills at Anthony, R. I., died at that place at the age of 69.

—Albert Bastoo, manager of the Columbia Worsted Mills at Wallingford, Pa., died early last month. Death is supposed to have been due to the heat.

—Franklin Washburn, of Brooklyn, N. Y., a manufacturer of linen goods, died July 7, from the effects of the heat.

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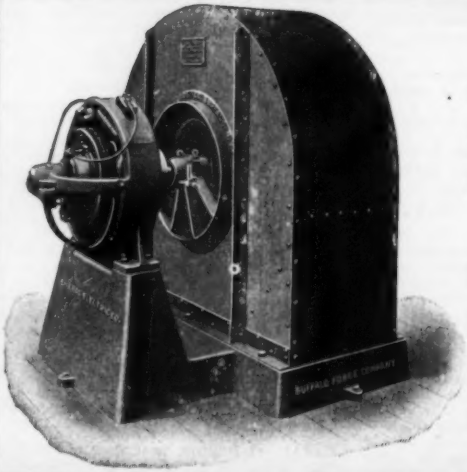
# Buffalo Forge Company Buffalo



Buffalo
Steel Plate Fans
Steam,
Pulley, Electric,
FOR
Heating,
Ventilating, Drying,
Mechanical
Draft, etc.

# Buffalo Forge Company Buffalo

# BUYERS' INDEX.

**Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.**

Alphabetical Index to Advertisements follows this Classified List.

**Air Moistening System.**
American Moistening Co., 150 Devonshire St., Boston.

**Arc Lamps.**
Lea Manufacturing Co., Elwood, Indiana.

**Architects and Mill Engineers.**
Ferguson, John W., Paterson, N. J.
Gray, Arthur F., Exchange Bldg., Boston.
Lockwood, Greene & Co., 93 Federal St., Boston, Mass.
Praray, C. A. M. & Co., Banigan Bldg., Providence, R. I.

**Artificial Stone.**
Warren Bros. Co., 143 Federal St., Boston.

**Asphalting & Asphalt Materials.**
Warren Bros. Co , 143 Federal St., Boston.

**Asphalt Roofing.**
Warren Bros. Co. 143 Federal St., Boston.

**Automatic Feeds for Cotton and Wool.**
Atlas Foundry & Mch. Co., Newark, N. J.
Philadelphia Dyeing Machinery Co., 6721 Germantown Ave., Phila., Pa.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Phila.
Smith, Jas. Woolen Machinery Co., Phila.

**Bailing Machine.**
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

**Bandings.**
*See under Yarns.*

**Bands and Labels.**
Docker-Foster Co., Phila., Pa.

**Baskets.**
Lane, W. T. & Bro., Port Chester, N. Y.

**Belting.**
Alexander Bros., 410 No. 3d St., Phila., Pa.
Boston Belting Co., Boston, Mass.
Dodge Mfg. Co., Mishawaka, Ind.
Jeffrey Manufacturing Co., Columbus, Ohio.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
Smith, Jas. Woolen Mach. Co., Phila, Pa.
Star Mfg. Co., Stamford, Conn.
*See also Mill Supplies.*

**Belt Dressing.**
Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.
Star Mfg. Co , Stamford, Conn.
Stephenson Mfg. Co., Albany, N. Y.

**Belt Hooks.**
Bristol Co., Waterbury, Ct.
Star Mfg. Co., Stamford, Conn.

**Belt Lace.**
Star Mfg. Co., Stamford, Conn.

**Bindings.**
*See Tapes and Braids.*

**Bleaching Materials.**
Bosson & Lane, Boston.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

**Block Cutting for Printing.**
Atlas Copper Stamp Works, 15 Whitehall St., New York.
International Mfg. Co., Brooklyn, N. Y.

**Blowers.**
American Blower Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant, B. F. Co., Boston, Mass.

**Bobbins, Spools, Shuttles, Etc.**
Murray, C. O., Nashua, N. H
Southern Bobbin Co., Greensboro, N. C.
Sweet & Doyle, Cohoes, N. Y.
Tebbets, E. L., & Co., Locke's Mill, Me.

**Boilers.**
*See Steam Boilers.*

**Boxes, Cloth Boards, Etc.**
Pearson, J. T, Kensington, Pa.

**Boxes Paper.**
*See Paper Boxes.*

**Braiding Machinery.**
New England Butt Co., Providence, R. I.
Textile Machine Works, Reading, Pa.

**Braids.**
*See Tapes, Braids and Edgings.*

**Brass (Perforated.)**
*See under Perforated Metal.*

**Brushes.**
Felton, S. A. & Son Co., Manchester, N. H.
Jacobus, A. G. Verona, N. J.
Parks & Woolson Mach. Co., Springfield, Vt.

**Brushers**
*See Napping Machines.*

**Burr Pickers.**
Atlas Foundry & Mch. Co., Newark, N. J.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G Sons, Graniteville, Mass.
Smith, Jas. Woolen Machinery Co., Phila.

**Calico Printers' Machinery and Supplies.**
Arlington Machine Works, (Arthur Birch) Arlington Heights, Mass.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.
Taunton New Bedford Copper Co., New Bedford, Mass.
Rusden Machine Co., Warren, R. I.
*See also Dyeing, Bleaching Machinery, etc*

**Canvas Baskets.**
Lane, W. T. & Bro., Port Chester, N. Y.

**Carbonizing Machinery.**
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Phila.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts , Phila.
Smith, Jas. Woolen Machinery Co., Phila.

**Card Clothing.**
Ashworth, Elijah, Fall River, Mass.
Booth, Benj. & Co., Philadelphia.
Leigh, Evan A, 35 Mason Building, Boston.

**Card Grinding Machinery.**
Hardy Machine Co., Biddeford, Me.
Smith, Jas. Woolen Machinery Co., Phila.

**Carders' Tools.**
Brown, W. H, Mechanic St, Worcester Mass.

**Carpet Machinery.**
Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1788 Barker St., Phila., Pa.
Parks & Woolson Mach. Co., Springfield, Vt.
Smith, Jas. Woolen Machinery Co., Phila.

**Cement "Dealers."**
Warren Bros. Co., 143 Federal St., Boston.

**Chemicals and Apparatus.**
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

**Cigars.**
Taylor & Stinson, 482 Bourse, Phila, Pa.
**Cling Surface.**
Cling Surface Mfg. Co., Buffalo, N. Y.
**Clocks.**
Howard, E. Clock Co., Marlboro Building Boston.
**Clutches.**
American Tool & Machine Co., Boston, Mass.
Dodge Mfg. Co., Mishawaka, Ind.
Eastern Machinery Co., The, New Haven, Conn.
Hunter, James, Machine Co., North Adams, Mass.
Smith, Jas. Woolen Machinery Co.. Phila.
**Combs (Wool and Cotton).**
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.
**Commission Merchants (Dry Goods, Knit Goods).**
Charleston Export & Commission Co., Charleston, S. C.
Doane, Thomas H., 333 Monroe St., Chicago, Ill.
Wagner, M. & Co.. 213 Ninth St., Pittsburg Pa.
**Concrete.**
Warren Bros. Co., 143 Federal St , Boston.
**Conveying Machinery and Chains.**
Jeffrey Manufacturing Co., Columbus, O.
Link Belt Machines Co., Chicago, Ill.
**Cop Tubes.**
*See Paper Tubes.*
**Copper (Perforated.)**
*See under Perforated Metal.*
**Copper Print Rollers.**
Phillips Co, The Thomas, Providence, R. I.
Taunton-New Bedford Copper Co , New Bedford, Mass.
**Copper Work for Dyers.**
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co , Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.
**Cotton Elevators.**
Buffalo Forge Co., Buffalo, N. Y.
Link Belt Machinery Co., Chicago Ill.
**Cotton Machinery.**
Altemus, W. W. & Son, 2816 N. 4th St, Phila. Pa.
American Loom Co., Readville, Mass.
Ashworth, Elijah, Fall River, Mass.
Atherton, A. T., Machine Co., Pawtucket, R. I.
Barber & Coleman, Pemberton Sq., Boston.
Butterworth, H. W. & Sons Co., Philadelphia.
Cheesman Co., 27 William St., New York.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Houghton, L. T. & Sons, Worcester, Mass.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Kitson Machine Co., Lowell, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lever, Oswald, Lehigh Ave. and Masher St., Philadelphia.
Lowe, Stephen C., 186 Devonshire St.. Boston, Agt. John Hetherington & Sons, Ltd.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
McKerrow, H. G , Boston, Mass.
Parks & Woolson Mach. Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Ring Frame Thread Protector Co., The Amsterdam, N. Y.
Saco & Pettee Machine Shops, Newton Upper Falls, Mass.
Schofield, Geo. L., Philadelphia.
Smith, Jas. Woolen Machinery Co., Phila.
Whitin Machine Wks, Whitinsville, Mass.

**Cotton Openers and Lappers.**
Atherton, A. T., Machine Co., Pawtucket R. I.
Kitson Machine Co , Lowell, Mass.
Howard & Bullough American Machine Co, Pawtucket, R. I.
**Cotton Softeners.**
Bosson & Lane, Boston, Mass.
Wilmington Oil Co., Wilmington, Del.
**Cotton Waste.**
Charles, W. B., Amsterdam, N. Y.
**Credits.**
National Mercantile Agency, New York and Boston.
**Cutters for Knit Fabrics.**
Goodwin, J. C., Diamond and Second Sts., Phila., Pa.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.
**Decoration Wash for Interiors.**
Moore, Benj. & Co., Brooklyn, N. Y.
**Dextrine.**
Stein, Hirsh & Co, 165 Duane St., New York.
**Dryers.**
American Blower Co., Detroit.
Arlington Machine Works, (Arthur Birch), Arlington Heights, Mass.
Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Hunter, Jas., Machine Co., No. Adams Mass.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I
Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville Mass.
Smith, Jas. Woolen Machinery Co., Phila.
Stafford, B. F. Co, 36 Olive St, Boston, Mass.
**Dusters.**
*See Wool and Waste Dusters.*
**Dust Collectors.**
Allington & Curtis Mfg. Co., Saginaw, Mich.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Phila.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Phila.

**Dyers, Bleachers and Finishers**
American Yarn Printing Works, 134-140 North 22d St., Philadelphia.
Barnesville Mfg. Co., Barnesville, Ga.
Brophy's, T, Sons, Jasper St, Philadelphia
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol, R. I.
Davidson & Brooke, 2560 No. 3rd St., Philadelphia.
Duncan & Baillie, Cohoes, N. Y.
Firth & Foster Co., Kensington, Pa.
Franklin Bleaching & Finishing Works, Ltd., 70th St., and Haverford Ave., Phila.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Knause Bleachery, Hamburg, Pa.
Lorimers, The Wm. H. & Sons Co., Phila.
Molt Bros., Millbury, Mass. (Indigo Blue.)
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Pond Lily Co., New Haven, Ct.
Providence Mills Mfg. Co., 55 Girard Ave., Philadelphia, Pa.
Rowland, Samuel, Schuylkill Haven, Pa.
U S. Finishing Co., New York.
Warren, W, Thread Works, Westfield, Mass.

**Dyeing, Drying, Bleaching and Finishing Machinery.**
Automatic Dyeing & Scouring Machinery Co , Box 80, Madison Branch, New York.
Arlington Machine Works, (Arthur Birch), Arlington Heights, Mass.
Antisdel, E. M., 12 Miller St., Utica, N. Y., (Knit Dryer.)
Birch Bros., Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W, & Sons Co Phila Pa.
Curtis & Marble Machine Co, Worcester, Mass.

Delahunty Dyeing Machine Co., Pittston, Pa.
Dubois, A. N., 2170 Ledgely Ave., Philadelphia, Pa. (Black for Hosiery.)
Fairmount Machine Co, 21 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Klauder-Weldon Dyeing Machine Co., Amsterdam, N. Y.
Knapp, C. H., Paterson, N. J.
Parks & Woolson Machine Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6731 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Philadelphia Textile Specialty Co., 500 North 12th St., Phila.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Smith, Jas. Woolen Machinery Co., Phila.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Webendorfer & Walling, Paterson, N. J.

**Dye House Cans.**
Hill, James Mfg. Co., Providence, R. I.

**Dyehouse Floors.**
Warren Bros., 143 Federal St., Boston.

**Dye Sticks.**
Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M., Philadelphia, Pa.

**Dyestuffs and Chemicals.**
Atteaux, F. E. & Co., 174-176 Purchase St., Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, A Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Calmore & Co., 501 Chestnut St., Phila.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co. 20 Cedar St, New York.
Dubois, A. N., 2170 Ledgely Ave., Phila., Pa.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Fortner, L. B., 36 Strawberry St., Phila.
Geisenheimer & Co, 189 Front St, New York.
Holliday & Sons, Ltd., Read, 7 Platt St., New York.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 132 Hudson St, N. Y.
Kuttroff, Pickhardt & Co., New York.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Molt Bros., Millbury, Mass. (Indigo Blue.)
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Roessler & Hasslacher Chemical Co, 100 William St, New York.
Ross, W. A. & Bro., 100 William St., N. Y.
Schoellkopf, Hartford & Hanna Co., Philadelphia, N. Y. and Boston.
Sharpless Dye Wood Ext. Co, The Bourse, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Sykes & Street, 85 Water St, N. Y.
Thayer, Ed. M., 106 Broad St., Boston, Mass.
United Indigo & Chemical Co., Ltd., 176 Federal St., Boston.
Vila, H. S., 115 So. 2nd St., Philadelphia, Pa.

**Dynamos.**
General Electric Co., 44 Broad St., New York
Sturtevant, Co., B. F. Boston.

**Edgings.**
*See Tapes, Braids and Edgings.*

**Elastic Web Calendering Machines.**
Knapp, C. H., Paterson, N. J.

**Electrotyping and Printing.**
Whitcomb, H. C, & Co, Boston.

**Elevators.**
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Eastern Machinery Co, The, New Haven Conn.
Jeffrey Manufacturing Co., Columbus, O.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

**Electrical Construction.**
General Electric Co., 44 Broad St., New York.

**Electric Fans.**
Buffalo Forge Co., Buffalo, N. Y.
General Electric Co., 44 Broad St., New York.
Philadelphia Drying Machinery Co., 6731 Germantown Ave., Phila., Pa
Sturtevant Co., B. F., Boston.

**Electric Lighting.**
General Electric Co., 44 Broad St., New York.

**Electric Lighting Apparatus.**
Incandescent Electric Light Manipulator Co., 168 Bedford St., Boston.

**Electric Motors.**
General Electric Co., 44 Broad St., New York.
Sturtevant Co., B. F., Boston.

**Engine Foundations.**
Warren Bros. Co., 143 Federal St., Boston.

**Engineers, Mechanical.**
Ferguson, John W, Paterson, N. J.

**Exhaust Heads.**
Burt Manufacturing Co, Akron, Ohio.

**Fans—Exhaust and Ventilating.**
*See Ventilating Apparatus.*

**Feed Water Heaters.**
Green Fuel Economizer Co., Matteawan N. Y.
Scaife, W. B. & Sons, Pittsburg, Pa.

**Feed Water Pumps.**
Goulds Mfg. Co, Seneca Falls, N. Y.
Scaife, W. B. & Sons, Pittsburg, Pa.

**Feeds**
*See Automatic Feeds.*

**Filters.**
Scaife, W. B. & Sons, Pittsburg, Pa.

**Finishing Machinery.**
*See Dyeing, Drying, Bleaching and Finishing.*

**Fluted Rolls.**
Cohoes Foundry & Machine Co, Cohoes, N. Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

**Forges.**
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

**Friction Clutches.**
*See Clutches.*

**Friction Hoisting Drums.**
Eastern Machinery Co., New Haven, Conn.

**Fuel Economizers.**
Green Fuel Economizer Co., Matteawan, N. Y.

**Fulling Mills for Woolen Goods.**
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.
Kenyon, D. R. & Son, Raritan, N. J.

**Garnetts.**
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Phila.
Smith, Jas. Woolen Machinery Co., Phila.

**Gas Engines.**
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

**Gas Exhausters.**
Sturtevant Co., B. F., Boston.

**Gears.**
New Process Raw Hide Co., Syracuse, N. Y.

**Gear Cutting Machine.**
Whiton, The D. E, Co, New London, Conn.

**Generating Sets.**
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F, Boston.

**Grate Bars.**
U. S. Rocking Grate Bar Co., Elizabeth, N. J.

**Heating.**
*See Ventilating.*

**Heddles.**
Watson, L. S, Mfg. Co, Leicester, Mass.

**Hoisting Machinery.**
The Eastern Machinery Co., New Haven, Conn.

**Hose.**
Boston Belting Co., Boston.

**Hosiery Labels.**
Docker, Foster Co., Philadelphia, Pa.
Saranac Electrical Mfg. Co., St. Joseph, Mich.

**Hosiery Boards.**
Pearson, J. T, Kensington, Pa.

**Humidifying Apparatus.**
American Air Moistening Co., Boston.

**Hydro Extractors.**
American Tool & Machine Co., Boston.
Rusden Machine Co., Warren, R. I.

**Ironing Machines for Knit Goods.**
Craw, J. W. Laundry Machinery Co., So. Norwalk, Conn.

**Key Seaters.**
Leisenring Mfg. Co., Philadelphia, Pa.

**Knit Goods Edgings, Trimmings, etc.**
Cathcart, John & Co., 115 Franklin St., New York.
Chapin, Geo. W. Philadelphia, Pa.
Charles, W, B., Amsterdam, N. Y.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Schneebeli, G. A. & Co., Nazareth, Penn.
Weimar Bros, 1817 East York St, Phila. Pa.

**Knit Goods Finishing Machines, Crochet, Etc.**
Craw, J. W. Laundry Machinery Co., So. Norwalk, Conn.
Industrial Mfg. Co., Camden, N. J.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.
Willcox & Gibbs Sewing Mch. Co., New York.

**Knitting Machine Cylinders.**
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

**Knitting Machinery (Cutters.)**
Goodwin, J. C., Second and Diamond Sts., Phila., Pa.

**Knitting Machinery.**
American Knitting Machine Co., 6th and Arch St., Philadelphia, Pa.
Antisdel, E. M., 12 Miller St., Utica, N Y.
Beattie, Wm. & Son, Cohoes, N. Y.
Branson Machine Co., 506 N. American St., Philadelphia.
Brinton, H. & Co., 213 Race St., Philadelphia, Pa.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co., 40 N. 7th St., Phila.
Lamb Knitting Mach. Mfg. Co., Chicopee Falls, Mass.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, Arthur, 760 Lexington Avenue., Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Snyder, Homer P. Mfg. Co., Little Falls, N. Y.
Stafford & Holt, Little Falls, N. Y.
Taylor, James, 835 Arch St., Philadelphia.
Tompkins Bros., Troy, N. Y.

**Knitting Needles and Supplies.**
Breedon, Wm, & Son, Amsterdam, N. Y.
Brinton, H. & Co., 213 Race St., Philadelphia, Pa.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co., 40 N. 7th St., Philadelphia.
Lamb Knitting Machine Mfg. Co., Chicopee Falls, Mass.
Manufacturers' Supplies Co., 66 No. 4th St. Philadelphia.
Mayo Knitting Machine & Needle Co Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

**Knotter for Spoolers.**
Barber & Coleman, 504 Sears Bldg., Boston.

**Labeling Machine.**
Saranac Electrical Mfg. Co., St. Joseph, Mich.

**Laboratory Outfits.**
Bullock & Crenshaw, 828 Arch St. Phila, Pa

**Looms.**
American Loom Co., Readville, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1733 Barker St, Phila., Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Ross, Hugh R., Belfast, Ireland.
Smith, Jas. Woolen Machinery Co., Phila.
Whitin Machine Works, Whitinsville, Ms.

**Loom Pickers.**
Loom Picker Co., Biddeford, Me.

**Lubricators.**
Dixon, Jos., Crucible Co, Jersey City, N. J.

**Lumber.**
Stearns, A. T, Lumber Co, Neponset, Mass.

**Lumpers.**
Gerry, George, & Son, Athol, Mass.

**Machinery Dealers.**
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L. Phila., Pa.
Taylor, James, 835 Arch St., Philadelphia.

**Machinists' Tools.**
Dodge Mfg Co., Mishawaka, Ind.
Leisenring Mfg. Co., Philadelphia, Pa.
Whiton, The D. E. Co, New London, Conn.

**Mails.**
Walder, J, Paterson, N. J.

**Measuring and Folding Machines.**
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.
Fabric Measuring & Packaging Co., Postal Telegraph Bldg, New York.
Parks & Woolson Mach. Co, Springfield, Vt.

**Mechanical Draft.**
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

**Mercerizing Machinery.**
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Klauder Weldon Dyeing Machine Co., Amsterdam, N. Y.
Philadelphia Textile Specialty Co., 500 North 12th St, Phila.
Rusden Machine Co., Warren, R. I.

**Mill Architects.**
*See Architects & Mill Engineers.*

**Mill Baskets.**
Lane, W. T. & Bro., Port Chester, N. Y.

**Mill Brushes.**
*See Brushes.*

**Mill Builders and Engineers.**
Ferguson, John W, Paterson, N. J.

**Mill Supplies.**
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Carpenter, Geo. B. & Co., Chicago, Ill.
Dixon Lubricating Saddle Co., Bristol, R.I
Dodge Mfg. Co., Mishawaka, Ind.
Douglas, R. D., Fall River, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Jeffrey Manufacturing Co., Columbus, O.
Lane, W. T. & Bro., Port Chester, N. Y.
Leisenring, John Mfg Co., Phila., Pa.
National Supply Co, Paterson, N. J.
Smith, Jas. Woolen Machinery Co., Phila.
Southern Bobbin Co., Greensboro, N. C.
Star Mfg. Co., Stamford, Conn.
Sweet & Doyle, Cohoes, N. Y
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

**Napping Machines.**
Columbia Napping Machine Co., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Parks & Woolson Mach. Co., Springfield, Vt.

**Noils (Silk.)**
Ryle, Wm. & Co., 54 Howard St., N. Y.
Malcolm Mills Co., Frankford, Pa.

**Oil Cabinets.**
New York Oil Cabinet Co., New York.

**Oil Filters.**
Burt Manufacturing Co., Akron, Ohio.

**Packing.**
Boston Belting Co , Boston.
Jenkins Bros., New York.

**Paint.**
Moore, Benj. & Co, Brooklyn, N. Y.

**Pantagraphs for Mill Engraving.**
Johnson, C. A, & Co, 22 Dey St, New York.

**Paper Tubes.**
Douglas, R. D., Fall River, Mass.

**Patent Solicitors.**
Crosby & Gregory, 34 School St, Boston, Mass.
Siggers, E. G., Washington, D. C.
Wolhaupter, D. P., Equitable Bldg., Washton, D. C.

**Pavers & Paving Materials.**
Warren Bros. Co., 143 Federal St., Boston.

**Perforated Metal.**
American Perforated Metal Co., 171 Wooster St., New York.
Beckley, A. J. & Co., Garwood, N. J.

**Peroxide of Sodium.**
Roessler & Hasslacher Chemical Co., 100 William St, New York.

**Picker Sticks.**
Loom Picker Co., Biddeford, Me.
Southern Bobbin Co., Greensboro, N. C.

**Pipe Covering.**
Keasbey, R. A, 83 Warren St, New York.

**Pneumatic Conveying.**
*See Ventilating.*

**Power Transmitting Machinery.**
Carpenter, Geo. B. & Co , Chicago Ill.
Dodge Mfg. Co , Mishawaka, Ind.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jeffrey Manufacturing Co., Columbus, O.
Kilburn, Lincoln & Co, Fall River, Mass.
Lambeth Rope Corporation, New Bedford, Mass.
Link Belt Machinery Co, Chicago, Ill.
Rusden Machine Co., Warren, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Phila.
Saginaw Manufacturing Co., Saginaw, Mich.
Smith, Jas. Woolen Machinery Co., Phila.

**Preparatory Machinery, (Cotton).**
Atherton, A. T., Mach. Co., Pawtucket, R. I.
Howard & Bullough Am. Machine Co., Pawtucket, R. I.
Kitson Machine Co., Lowell, Mass.
Saco & Pettee Machine Shops, Newton Upper Falls, Mass.

**Presses.**
Boomer & Boschert Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Crawford J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co. The Thomas, Providence, R. I.

**Printers (Fabrics and Yarn.)**
American Yarn Printing Works, Philadelphia.

**Pulley Covers.**
Warren Co , The (Inc.), 34 Jackson St , Chicago, Ill.

**Pulleys.**
*See Power Transmitting Machinery.*

**Pumps.**
Goulds Mfg. Co, Seneca Falls, N. Y.
Rusden Machine Co., Warren, R. I.

**Purifying & Filtration Plants.**
Scaife, W. B. & Sons, Pittsburg, Pa.

**Rag Pickers.**
Smith, Jas. Woolen Mach. Co., Phila, Pa.

**Raw Hide Gears.**
New Process Raw Hide Co. Syracuse, N. Y

**Reed and Harness Manufacturers.**
American Supply Co, Providence, R. I.
Leisenring, John Mfg. Co., Phila.
Loom Picker Co., Biddeford, Me.
Walder, J, Paterson, N. J.

**Ribbons.**
Barton, F. C., 54 Franklin St., New York.
Cheney Bros, S. Manchester, Ct.

**Ring Travellers.**
National Ring Traveller Co., Providence, R. I.
Morley Button Mfg. Co., Boston.

**Roofing Asphals.**
Warren Bros. Co., 143 Federal St., Boston.

**Roofing Materials (Manufacturers).**
Warren Bros. Co., 143 Federal St., Boston.

**Rope Transmission.**
American Mfg. Co., New York.
Carpenter, Geo. B & Co., Chicago, Ill.
Dodge Mfg. Co , Mishawaka, Ind.
Lambeth Rope Co poration, New Bedford, Mass''
Link Belt Mfg. Co., Chicago, Ill.

**Roving Cans.**
Diamond State Fibre Co., Elsmere, Del.
Hill, James Mfg. Co., Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.
Laminar Fibre Co., No. Cambridge, Mass.
Walrus Fibre Mfg. Co., Medford, Mass.

**Rubber Covered Rollers and Goods.**
Boston Belting Co., Boston.

**Saddles and Stirrups.**
Dixon Lubricating Saddle Co., Bristol, R. I

**Sample Cards and Mounting.**
Merchants Sample Card Co., 33 Sullivan St., New York.

**Scales**
Sweet& Doyle, Cohoes, N. Y.

**Schools.**
American Correspondence School of Textile, New Bedford, Mass
Georgia School of Technology, Atlanta, Ga.
Lee's College, Charlotte, N. C.
New Bedford Textile School, New Bedford, Mass.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

**Screens (Perforated.)**
*See under Perforated Metal.*

**Selling Agents.**
*See Commission Merchants.*

**Separators.**
Ring Frame Thread Protector Co., The Amsterdam, N. Y.
Draper Co , The, Hopedale, Mass.

**Sewing Machines and Supplies.**
Arlington Machine Works, (Arthur Birch), Arlington Heights, Mass.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fales, L. F., Walpole, Mass.
Industrial Mfg. Co., Camden, N. J.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Rusden Machine Co., Warren, R. I.
Union Button Sewing Mch. Co., 164 High St., Boston.
Willcox & Gibbs S. M. Co., New York.

**Shafting Hangers, Etc.**
*See Power Transmission Machinery.*

**Shearing Machinery.**
*See Dyeing, Drying, Bleaching and Finishing.*

**Shell Rolls.**
Cohoes Foundry & Mach. Co. Cohoes, N. Y
Thurston, A. G, & Son, Box 538, Fall River, Mass.

**Shoddies.**
*See Wool Shoddies.*

**Shuttles.**
*See Bobbins, Spools, Shuttles, Etc.*

**Silk Machinery.**
Butterworth, H. W. Sons Co, Philadelphia.

Granger Foundry & Machine Co., Providence, R. I.
Knapp, C. H., Paterson, N. J.
Mason Machine Works, Taunton, Mass.
Rusden Machine Co., Warren, R. I.

**Singe Plates.**
Butterworth, H. W. Sons Co., Philadelphia.
Taunton-New Bedford Copper Co., New Bedford, Mass.

**Singeing Machines.**
Arlington Machine Works, (Arthur Birch), Arlington Heights, Mass.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.
Knapp, C. H , Paterson, N. J.
Rusden Machine Co., Warren, R. I.

**Sizing, Starch and Gums.**
Arabol Mfg. Co., 155 William St., New York.
O. K. Soap Co., 968 Franklin St., Phila.
Potter, R. V. B., 231 Chestnut St., Phila.
Stein, Hirsch & Co, 165 Duane St, New York.

**Sky Lights.**
Drouve, The G. Co., Bridgeport, Ct.

**Slashers.**
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips The Thomas, Co., Providence, R.I.

**Soaps.**
India Alkali Works, Boston, Mass.
O. K. Soap Co., 968 Franklin St., Phila.

**Spindles.**
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Ward & Undergrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

**Spindle Tubes.**
Bamford & Smith, Pascoag, R. I.

**Spinning Cylinders.**
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

**Spinning Frames.**
*See Cotton Machinery.*

**Spinning Rings.**
Draper Company, Hopedale, Mass
Whitinsville Spinning Ring Co, Whitinsville, Mass.

**Spinning Tubes.**
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

**Spools.** *See Bobbins, Spools Shuttles, Etc.*

**Spool Cotton for Mfrs. Use.**
Warren, W. Thread Works, Westfield, Mass.

**Spooler Knotter.**
Barber & Coleman, 504 Sears Bldg., Boston.

**Sprinklers**
International Sprinkler Co., Philadelphia, Pa.

**Stamps for Hosiery.**
Atlas Copper Stamp Works, 15 Whitehall St., N. Y.
International Mfg. Co., Brooklyn N. Y.
Wells, Wilfred, 805 W. Lehigh Ave., Philadelphia.

**Steam Boilers.**
Babcock & Wilcox Co., The, 29 Cortland St., New York City.
Brown, C. H, & Co, Fitchburg, Mass.

**Steam Boiler Insurance.**
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

**Steam Engines.**
American Blower Co , Detroit, Mich.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. & Co., Boston.

**Steam Surface Coverings.**
Keasbey, Robert A., New York.

**Steam Specialties.**
Butterworth. H. W. Sons Co., Philadelphia
Jenkins Bros., New York.
Rusden Machine Co., Warren, R. I.
Sturtevant Co., B F., Boston.
U. S. Rocking Grate Bar Co., Elizabeth, N.J.

**Steam Valves.**
Jenkins Bros., New York.

**Tanks, Tubs and Vats.**
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Cypress Lumber Co, Apalachicola, Fla.
Lewis, H. F. & Co., New Orleans, La.
Rusden Machine Co. Warren, R. I.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa.

**Tapes, Braids and Edgings.**
Batton, F. C., 54 Franklin St., New York.
Cathcart, John, & Co, 115 Franklin St, N. Y
Chapin, Geo. W Philadelphia, Pa.
Friedberger Mfg. Co, Germantown, Pa.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald st., Philadelphia.
Schneebeli, G. A. & Co., Nazareth, Pa.
Weimar Bros, 1817 East York St, Phila, Pa.

**Telephones.**
Mianus Electric Co., Mianus, Conn.
Plummer, F. O. 620 Atlantic Ave., Boston.

**Temples.**
American Loom Co., Readville, Mass.
Draper Co., Hopedale, Mass.

**Tension Pulleys.**
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

**Tentering Machines.**
*See Dyeing, Bleaching Machinery, Etc.*

**Tenter Clips.**
*See Dyeing, Drying, Bleaching and Finishing Machinery.*

**Testing Machines.**
Howard, Geo. C., 1783 Barker St., Phila., Pa

**Textile Schools.**
*See Schools.*

**Thread Board for Spinning & Twisting Frames.**
Houghton, L. T. & Sons, Worcester, Mass.

**Thread Protectors.**
Ring Frame Thread Protector Co., The, Amsterdam, N. Y.

**Tickets and Labels.**
Saranac Electrical Mfg Co. St. Joseph, Mich.

**Time Recorders.**
Simplex Time Recorder Co., Gardner, Mass.

**Towers.**
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.

**Tower Clocks.**
Howard, E. Clock Co., Marlboro Building, Boston.

**Turbine Governors.**
Replogle Governor Works, Akron, O.

**Turbines.**
*(See Water Wheels.)*

**Valves—Rubber.**
Boston Belting Co., Boston, Mass.

**Ventilating Apparatus.**
Allington & Curtis Mfg. Co , Saginaw, Mich., 81 Wareham St., Boston.
American Air Moistening Co., Boston.
American Blower Co., Detroit, Mich.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Drouve, The G. C ., Bridgeport, Ct.
New England Ventilating & Heating Co, Providence. R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass
Wing, L. J. Mfg. Co., 95 Liberty St., N. Y.

**Wall Whitening.**
Moore, Benj. & Co, Brooklyn, N. Y.

**Warp Stop Motions.**
Am. Loom Co., Readville, Mass.
Draper Co., Hopedale, Mass.

**Washers (Cloth).**
Arlington Machine Works, (Arthur Birch), Arlington Heights, Mass.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kenyon, D. R., & Son, Raritan, N. J.

Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co , Warren, R. I.
Webendorfer & Walling, Paterson, N. J.

**Watchman's Clocks.**
Am. Watchman's Time Detector Co., Broadway, N. Y.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Howard, E. Clock Co., Marlboro Building, Boston.
Nanz & Co, 127 Duane St., New York.

**Waterproof Floors.**
Warren Bros. Co., 143 Federal St., Boston.

**Water Purifiers & Filters.**
Scaife, W. B. & Sons, Pittsburg, Pa.

**Water Wheels.**
Alcott, T. C., & Son, Mt. Holly, N. J.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

**Water Wheel Governors.**
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Leffel, James & Co, Springfield, Ohio.
Replogle Governor Works, Akron, O.

**Winders. (Back.)**
Taylor, Jas., 835 Arch St., Philadelphia.

**Winder Bobbins.**
Sweet & Doyle, Cohoes, N. Y.

**Winders. (Hosiery.)**
Altemus, W. W. & Son, Philadelphia.
Foster Machine Co., Westfield, Mass.
Lever, Oswald, Lehigh Ave. and Mascher St., Philadelphia.
Universal Winding Co, 95 South Street Boston.

**Wood Pulleys.**
Beggs, James & Co., 9 Dey St., New York.
Dodge Mfg Co., Mishawaka, Ind.
Saginaw Manufacturing Co, Saginaw, Mich

**Wool Burrer.**
Cheesman Co., 27 William St., New York.

**Wool Cleaning Compound.**
India Alkali Works, Boston.

**Wool Combing Machinery.**
Leigh, Evan A. 35 Mason Bldg., Boston.

**Wool and Waste Dusters.**
Atlas Foundry and Mch. Co., Newark, N. J.
Gerry, Geo. & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Smith, Jas. Woolen Machinery Co., Phila.

**Woolen and Worsted Machinery.**
Altemus, W. W. & Co, 2816 N. 4th St, Phila., Pa.
American Tool and Machine Co., Boston.
Arlington Mch. Works (Arthur Birch), Arlington Heights, Mass.
Atlas Foundry and Mch Wks., Newark, N.J.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Cheesman Co., 27 William St , New York.
Curtis & Marble Machine Co, Worcester, Mass.
Fales, L. F , Walpole, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1733 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Lever, Oswald, Lehigh Ave. and Mascher St., Philadelphia, Pa.
Lowe, Stephen C., 186 Devonshire St., Boston. Agt. John Hetherington & Sons, Ltd.
Parks & Woolson Machine Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Schofield, Geo. L., Philadelphia.
Smith, Jas. Woolen Machinery Co., Phila.

**Wool Shoddies.**
Slack, Wm. H. H., & Bro, Springfield, Vt.

**Wool Washing, Preparing and Drying Machinery.**
Hunter, Jas. Machine Co., No. Adams, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Phila.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.
Smith, Jas. Woolen Machinery Co., Phila.

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# YARNS, THREADS, ETC.

**Banding.**
Lambeth Rope Corp., New Bedford, Mass.
Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

**Cotton Yarns.**
American Cotton Yarn Exchange, 67 Chauncy St., Boston.
Barnesville, Mfg. Co., Barnesville Ga.
British Cotton and Wool Dyers' Association, Ltd., 231 Chestnut St., Phila., Pa.
Buckingham & Paulson, 83 Leonard St., New York.
Catlin & Co, New York and Boston.
Charles, W. B., Amsterdam, N. Y.
Dana Warp Mills, Westbrook. Me.
Dexter Yarn Co., Pawtucket, R. I.
Dodds, J. S., 517 Wool Exchange, New York
Eddy & Street, Providence, R. I.
Spring St., N. Y.
Eichmann & Sternberg, New York.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E. & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
Morgan, E. A. 54 Franklin St., N. Y.
New England Cotton Yarn Co , New Bedford, Mass.
Orswell Mills, Fitchburg, Mass.
Salkeld, A. D. & Bro., 66 Leonard St., N. Y.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

**Cotton Yarns Wool Spun.**
Broadbent, J. & Sons, Unionville, Conn.

**Flax. Hemp. Jute and Ramie.**
Fawcett, Hughes, 115 Franklin St., N. Y
Eichmann & Sternberg, 530 Broadway, N. Y.
Morgan, E. A., 54 Franklin St., N. Y.

**Gassed Yarns.**
British Cotton and Wool Dyers' Association, Ltd , 231 Chestnut St., Phila., Pa.
Dodds, J. S., 517 Wool Exchange, New York.
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Whittier Cotton Mills, Lowell, Mass.

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**Hosiery and Knitting Yarns.**

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Dexter Yarn Co., Pawtucket, R. I.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Mitchell, James E, & Co, Phila. and Boston
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New England Cotton Yarn Co., New Bedford, Mass.
Orswell Mills, Fitchburg, Mass.
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Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co. N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

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Lorimer, Wm. H. & Sons Co., Philadelphia.
Montgomery, J. R. & Co., Windsor Locks, Conn.
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Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

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Goff, D. & Sons, Pawtucket, R. I.
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# Alphabetical Index to Advertisements.


| | page |
|---|---|
| Alcott, T. C. & Son | 414 |
| Alexander Bros., | 240 |
| Allegheny Worsted Mills, | 376 |
| Allington & Curtis . Outside Back Cover | |
| Altemus, W. W. & Son, | 236 |
| American Blower Co | 415 |
| American Correspondence School of Textiles, | 367 |
| American Cotton Yarn Exchange, | — |
| American Knitting Machine Co., | 404 |
| American Loom Co., The, | 218 |
| American Mfg. Co., | 248 |
| American Moistening Co. | 374 |
| American Perforated Metal Co. | 238 |
| American Supply Co., | 226 |
| American Tool and Machine Company | 395 |
| Am. Watchman's Time Detector Co. | 239 |
| American Yarn Printing Works | 391 |
| Antisdel, E. M. | 409 |
| Arabol Mfg. Co., The | 239 |
| Arlington Mach. Works (Arthur Birch), | 394 |
| Ashworth, Elijah, | 229 |
| Atlas Copper Stamp Works | 241 |
| Atlas Foundry Mch. Co., | 231 |
| Atherton Machine Co., The A. T. | 218 |
| Atteaux, F. E. & Co. | 388 |
| Automatic Dyeing & Scouring Mch'y Co., | 360 |
| Babcock & Wilcox Co., The, | 233 |
| Bailey, Frank | 393 |
| Bamford & Smith, | 400 |
| Barber & Coleman | 218 |
| Barnesville Mfg. Co. | 372 |
| Barton, F. C., | 377 |
| Beattie, Wm. & Son | 410 |
| Beckley, A. J. & Co. | 238 |
| Berlin Aniline Works, | 389 |
| Berry, A. Hun, | 393 |
| Birch Bros. | 227-394 |
| Bischoff, C., & Co., | 391 |
| Boomer & Boschert Press Co. | 370 |
| Booth, Benj. Co. | 229 |
| Bosson & Lane, | 392 |
| Boston Belting Co., | 237 |
| Boyer, B. F. & Co, | 376 |
| Branson Machine Co, | 404 |
| Breedon Sons, Wm., | 411 |
| Brinton, H., & Co. | 407 |
| Bristol Co., The Outside Back Cover. | |
| British Cotton & Wool Dyers' Ass'n | 381 |
| Broadbent, J. & Sons, | 379 |
| Brophy's, T, Sons | 381 |
| Brown, C. H, & Co, | 236 |
| Brown, W. H, | 242 |
| Buckingham, Paulson & Co., | 379 |
| Buckley's Benj., Son, | 242 |
| Buffalo Forge Co. | 348 |
| Burt Mfg. Co. | 232 |
| Butterworth H. W. & Sons Co., | 209 |
| Caldwell, W. E. Co. | 396 |
| Calmore & Co., | 405 |
| Campion, Richard, | 378 |
| Carpenter, Geo. B., & Co. | 224 |
| Cathcart, John & Co. | 410 |
| Catlin & Co, | 375 |
| Chapin, Geo. W., | 365 |
| Charles, William B. | 365 |
| Charleston Export & Com. Co., | 365 |
| Cheesman Co. | 243 |
| Cheney Bros, | 378 |
| Cling Surface Co. | 346 |
| Cohoes Foundry & Machine Co., | — |
| Columbia Napping Machine Co. | 400 |
| Cooper, Chas, | 410 |
| Corey, S. J., | 391 |
| Corey, Wm., Co., | 411 |
| Crabb, Wm, & Co, | 240 |
| Crane Mfg. Co., | 410 |
| Cranston Worsted Mills, | 376 |
| Craw, J. W. Laundry Mchy. Co., | 401 |
| Crawford, J. J. & Son., | — |
| Croft, Howland, Sons & Co, | 376 |
| Crosby & Gregory, | 247 |
| Curtis & Marble Machine Co., | 400 |
| Cypress Lumber Co, | 396 |
| Dana Warp Mills | 374 |
| Davidson & Brooke | 381 |
| Delabunty Dyeing Mch. Co. | 395 |
| Dexter Yarn Co., | 379 |
| Diamond State Fibre Co. | 235 |
| Dillon & Co, | 391 |
| Dixon, Jos., Crucible Co., | 231 |
| Dixon Lubricating Saddle Co. | 226 |
| Doane, Thomas H. | 365 |
| Docker-Foster Co. | 410 |
| Dodge Manufacturing Co. | 220 |
| Dodge Needle Co. | — |
| Dodds, J. S. | 379 |
| Douglas, R. D. | 229 |
| Drouve Co., The G. | 239 |
| Draper Company | 211 |
| Dubois, A. N. | 390 |
| Duncan & Baillie, | 384 |
| Eastern Machinery Co. | 414 |
| Easton-Burnham Co., | 370 |
| Eco Magneto Clock Co, | 239 |
| Economizer | 234 |
| Eddy & Street, | 365 |
| Eichmann & Sternberg, | 379 |
| Elliot & Hall, | 238 |
| Excelsior Knitting Machine Mfg. Co, | 406 |
| Fabric Measuring and Packaging Co. | 223 |
| Fairmount Machine Co, | 222 |
| Fales, L. F., | 400 |
| Farbenfabriken of Elberfeld Company, | 386 |
| Fawcett, Hughes, | 375 |
| Felton, S. A. & Son Co., | 226 |
| Ferguson, John W., Outside Back Cover | |
| Firth & Foster Co | 388 |
| Fortner, L. B. | 390 |
| Foster Machine Co. | 219 |
| Franklin Bleaching & Finishing Works | 383 |
| Friedberger Mfg. Co. | 403 |
| Furbush, M. A. & Son Machine Co. | 248 |
| Geisenheimer & Co. Outside Back Cover. | |
| General Electric Co., | 233 |
| Gerry, Geo. & Son, | 193 |
| Goff, D. & Sons | 370 |
| Goodwin, J. C. | 412 |
| Goulds Mfg. Co, | — |
| Granger Foundry & Machine Co., Inside Front Cover. | |
| Grant Yarn Co., | 375 |
| Gray, Arthur F. | 366 |
| Greene & Daniels Mfg. Co., | 372 |
| Green Fuel Econimizer Co., | 233 |
| Greenwood, R., & Bault, | 384 |
| Haedrich E. M. | 393 |
| Guild, W. B. | 368 |
| Hardy Machine Co., | 231 |
| Hart, Chas. | — |
| Hartford Steam Boiler Inspection & Insurance Co., | 238 |
| Hepner & Horwitz, | 400 |
| Hill, James Mfg Co., | 235 |
| Home Bleach & Dye Works, | 381 |
| Hooven, Owens & Rentschler Co, | — |
| Houghton, L. T., | 225 |
| Howard, E. Clock Co. | 239 |
| Howard, Geo. C., | 234-391 |
| Howard & Bullough Am. Machine Co., | 213 |
| Hunter, Jas, Machine Co, | 398 |
| Hunt, Rodney, Machine Co, | 399 |
| Hyde, Edward S., | 365 |
| Incandescent Electric Light Manipulator Co. | 242 |
| India Alkali Works, | 238 |
| Indian Orchard Co. | 372 |
| Industrial Manufacturing Co., | 412 |
| International Mfg. Co | 241 |
| International Sprinkler Co., | 242 |
| Ives, Loyal T. | 411 |
| Jacobus, Austin G. | 228 |
| Janney, O. S., & Co., | 392 |
| Jefferson, Edw, & Bro., | 357 |
| Jeffrey Mfg. Co. | 414 |
| Jenckes, E., Mfg. Co., | 379-407 |
| Jenkins Bros., Outside Back Cover. | |
| Johnson, Chas. A., & Co., | 238 |
| Johnson, Wm. G. & Co. | 388 |
| Jones, J. Howell | 391 |
| Jones, Lewis | 407 |
| Keasbey, Robert A. Outside Back Cover. | |
| Keller, John J., & Co., | 387 |
| Kennedy, Thos, | 412 |

| | page |
|---|---|
| Kenyon, D. R. & Son, | 397 |
| Keystone Knitting Machine Mfg. Co. | 411 |
| Kilburn, Lincoln & Co., | 226 |
| Kitson Machine Co. | 215 |
| Klipstein, A., & Co., Outside Back Cover. | 392 |
| Klauder-Weldon Dyeing Machine Co. | 394 |
| Knapp, C. H. | 232 |
| Knause Bleachery | 384 |
| Koechl, Victor, & Co, | 385 |
| Krout & Fite Mfg. Co., | 377 |
| Kuttroff, Pickhardt & Co. | 246 |
| Lamb Knitting Machine Co. | 409 |
| Lambeth Rope Co., Outside Back Cover. | |
| Laminar Fibre Co., | 235 |
| Lane, W. T. & Bro., | 236 |
| Lea Electric Mfg. Co., | 240 |
| Lee's College | 366 |
| Leffel, James, & Co, | 414 |
| Leigh, Evan Arthur, | 226 |
| Leighton Mch. Co., | 406 |
| Leikenring Mfg. Co., | 234 |
| Lever, Oswald | 223 |
| Lewis, H. F. & Co., Ltd., | 391 |
| Link Belt Machinery Co., | 222 |
| Lockwood, Greene & Co. | 386 |
| Loom Picker Co., | 231 |
| Lorimer's, Wm. H. Sons Co., | 384 |
| Lowe, S. C. | 217 |
| Lowell Machine Shop, | 210 |
| Lowell Textile School, | 367 |
| Malcolm Mills Co., | 376 |
| Manufacturers' Supplies Co. | 411 |
| Mason, Daniel | 378 |
| Mason Machine Wks., | 212 |
| Mathesen, & Co., Wm. J., | 386 |
| Mayo Knitting Machine & Needle Co, | 411 |
| McKerrow, H. G. | 216 |
| McMichael & Wildman Mfg. Co, | 402 |
| Merchant Sample Card Co., | 236 |
| Merriam, G. & C., Co., | 204 |
| Merrow Machine Co., | 409 |
| Mianus Elec. Co., | 239 |
| Mitchell Jas. E., & Co., | 375 |
| Molt Bros. | 388 |
| Montgomery, J. R., Co., | 374 |
| Monument Mills, | 372 |
| Moore, Benjamin & Co., | 240 |
| Moore, C., & Co., | 375 |
| Morgan, E. A. | 375 |
| Morley Button Mfg. Co., | 227 |
| Mueller, A. | 412 |
| Murray, C. O. | 240 |
| Nanz & Co, | 234 |
| National Mercantile Agency | 384 |
| National Mill Supply Co. | 229 |
| National Ring Traveler Co., The | 227 |
| New Bedford Textile School | 367 |
| New England Butt Co., | 412 |
| New England Cotton Yarn Co | 378 |
| New England Ventilating & Heating Co., | 393 |
| New Process Raw Hide Co., | 240 |
| N. Y. & Boston Dyewood Co, | 392 |
| N. Y. Oil Cabinet Co., | 212 |
| Nye & Tredick, | 402 |
| Oakes Mfg. Co, | 388 |
| O. K. Soap Co. | 379 |
| Orswell Mills, | 374 |
| Page Needle Co., | 411 |
| Parks & Woolson Mch Co. Outside Back Cover | |
| Pawtucket Dyeing & Bleaching Co. | 381 |
| Paxton & O'Neill, | 408 |
| Pearson, J.T., | 408 |
| Pepper Mfg. Co., | 406 |
| Philadelphia Drying Machinery Co. | 222 |
| Philadelphia Textile Machinery Co., | 221-393 |
| Philadelphia Textile School, | 367 |
| Phila. Textile Specialty Co. | 394 |
| Phillips, The Thomas, Co, | 416 |
| Plummer, F. O., | 239 |
| Pocasset Worsted Co., | 370 |
| Pond Lily Co., The | 384 |
| Popham, Henry & Son | 240 |

| | page |
|---|---|
| Potter, R. V. B. | 228 |
| Praray, C. A. M. & Co., | 366 |
| Providence Mills Company | 383 |
| Ring Frame Thread Protector Co., | 224 |
| Replogle Governor Works, The | 414 |
| Roessler & Hasslacher Chemical Co, | 385 |
| Ross, Hugh R. | 219 |
| Ross, W. A, & Bro., | 390 |
| Rowland, Sam'l | 384 |
| Rusden Mch. Co., | 244 |
| Ryle, William. & Co., | 378 |
| Saco & Pettee Machine Shops, | 222 |
| Saginaw Mfg. Co. | 396 |
| Salkeld, A. D. & Bro., | 365 |
| Saranac Electrical Mfg., Co. | 224 |
| Sargent's, C. G., Sons, | 231 |
| Scaife, W. B. & Sons | 241 |
| Schofield, Geo. L. | 357 |
| Schoellkopf, Hartford & Hanna Co., | 387 |
| Schoon & Crabtree | 376 |
| Schneebeli, G. A. & Co., | 358 |
| Scott & Williams | 408 |
| Seaboard Air Line | 366 |
| Sharpless Dyewood Extract Co., | 388 |
| Siggers, E. G. | 247 |
| Simplex Time Recorder Co. | 413 |
| Skerry, A. T, & Co, | 377 |
| Slack, Wm. H. H. & Bro. | 400 |
| Smith, Jas, Woolen Machine Co. | 230 |
| Snyder, Homer P. Mfg. Co. | 410 |
| Solis, Andrew J. Jr., & Co., | 265 |
| Southern Bobbin Co. | 228 |
| Southern Railway | 366 |
| Stafford & Holt, | 405 |
| Stamford Mfg. Co., | 389 |
| Star Mfg. Co., | 229 |
| Stearns, A. T, Lumber Co, | 396 |
| Stein, Hirsch & Co., | 391 |
| Stephenson Mfg. Co., | 416 |
| Sturtevant, B. F. Co., Inside Back Cover | |
| Sweet & Doyle | 225 |
| Sykes & Street, | 389 |
| Taunton-New Bedford Copper Co., | 393 |
| Taylor, Jas. | 405 |
| Taylor & Stinson | 356 |
| Tebbets, E. L. & Co., | 229 |
| Thayer, Edward M. | 388 |
| Thun & Janssen | 229 |
| Thurston, A. G. & Son, | — |
| Tompkins Bros., | 410 |
| Torrance Mfg. Co., | 401 |
| Townsend, Thomas | 278 |
| Treat, Orion, | 411 |
| Tucker & Cook Mfg. Co., | 375 |
| Union Button Sewing Mch. Co., | 413 |
| United Indigo & Chemical Co., Ltd., | 390 |
| United States Finishing Co., | 382 |
| United States Rocking Grate Co. | 415 |
| Universal Winding Co., | 237 |
| Vila, H. S. | 391 |
| Wagner, M. & Co. | 365 |
| Walcott & Campbell Spinning Co, | 375 |
| Walder, J., | 228 |
| Walrus Fibre Mfg Co., | 234 |
| Ward & Vandegrift | 228 |
| Wardwell Needle Co., | 411 |
| Warren Bros. Co. | 229 |
| Warren Co., The | 394 |
| Warren, W., Thread Works, | 3 2 |
| Watson, L. S, Mfg. Co, | 236 |
| Weimar Bros. | 377 |
| Wells, Wilfred | 407 |
| Whitcomb, H. C, & Co, | 242 |
| Whitin Machine Works, | 214 |
| Whitinsville Spinning Ring Co., | 227 |
| Whiton D. E. Machine Co., | 415 |
| Whittier Mills, | 378 |
| Willcox & Gibbs Sewing Machine Co. | 408 |
| Wilmington Oil Co. | 401 |
| Wing, L. J. Mfg. Co., The | 413 |
| Wolhaupter, D. P. | 247 |
| Woolford, George, | 396 |



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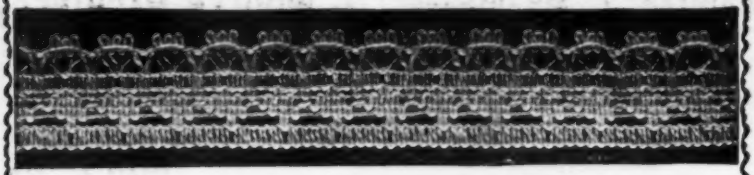

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The business of this department is held strictly confidential.

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1891 **Supt. of Woolen or Worsted** Mill, who understands designing, is open to a position. 28 years of age; an American; single. Well recommended, and with good experience.

1823 **Supt., Designer or Overseer** of weaving. Age 42; English; married. Large experience on fancy cassimeres, cloakings, beavers, meltons, plaid backs, golf caps, rugs, union worsted suitings and government work, flannels, face-finished goods, and can make them up from the yarn. Is familiar with Crompton & Knowles and English looms.

1398 **Woolen Superintendent or Designer** of recognized ability and at present employed as a superintendent of 36 set woolen and worsted mill. He finds it necessary to remove from New Jersey on account of his wife's health. His past record is first-class and this is an unusual opportunity to secure the services of a first-class superintendent.

1575 **Assistant Supt. Woolen.** A graduate of the Philadelphia Textile School (highest standing), and has had more than 7 years' experience in the various departments of a Massachusetts mill. Wants to get a start where there is fair chance of advancement. Age 28, single.

1856 **Supt. Worsted Yarn Mill.** 35 years old; Scotch; married. All kinds of worsted yarns in the gray mixtures and mottled, especially fine numbers. Bradford system.

1216 **Woolen Supt.**, boss weaver or designer. Has worked on worsteds, cassimeres and dress goods. Age 37; married; American. Worked in first-class N. E. mills. Can furnish references.

## COTTON SUPERINTENDENTS.

1877 **Agent or Treasurer.** Good references. Recently assistant manager of a large mill. Fully competent.

1806 **I would like** to correspond with some president or manager of some cotton mill now running or any new mill now being constructed, who would like to engage a competent superintendent. I want to engage with a cloth mill of any number of spindles not exceeding 10,000. My price is $1,000 a year, with no loss of time. I am a practical manufacturer, of long experience as overseer and superintendent. I am a good manager, full of push and energy, and I have a good record as a hustler for big productions and making money for my employers. Strictly temperate.

1802 **Supt.** or agent of small cotton or knitting mill, or would take a position as overseer of cotton carding. 33 years old; American. Has worked on sheetings, shirtings and fancy goods, and hosiery and mill supplies. Wants about $25 per week.

1867 **Assistant Manager** who understands the handling of cottons and linens, desires position in a cotton mill. 24 years of age; American; unmarried. Can satisfy anyone in regard to references, experience, etc.

1872 **Supt. and Carder of Cotton.** Has handled all classes of goods 35 years; American, married. Best of references.

1806 **Supt. of a Cotton Weaving Mill,** colored or white, 5,000 to 10,000 spindles; or overseer of weaving in a cotton mill, on any kind of work and any size mill, white or colored. Will go East, West, North or South, Canada or Mexico. Has had good and long experience. A married man; 40 years old, strictly temperate. Can give references as to ability and character.

1527 **Supt. of Cotton Mill,** or overseer of mule or ring spinning is open to a position; 16 years experience in Northern mills, on yarns, denims, awnings, apron checks, bicycle suitings, shirtings, etc, etc. Familiar with all well-known makes of cotton machinery; 29 years old; American; married. Can give references from large Massachusetts mills.

1898 **Cotton Supt.**, 33 years old, married, and an American, experienced on coarse and fine yarns and white goods, is open to a position. Conversant with all standard makes of cotton machinery. Can refer to prominent Mass. men in the cotton trade.

1896 **General Manager** and Superintendent of cotton mill desires position; 37 years old; single; English. 18 years' experience on yarns, flannelettes, denims, grays, and shirtings. Good references.

## WOOLEN CARDERS.

1798 **Boss Carder,** or carder and spinner. Age 49; English. Large experience on fine, medium and coarse wool, also wool, cotton and shoddy mixes, cassimeres, flannel , blankets, kerseys, meltons, beavers, government goods, etc. Excellent references and first class man in every respect. Was nine years boss carder in England and has held good positions in this country as boss carder and spinner.

1899 **Worsted Carder,** 9 years in large mill in Lawrence, would like a position; 23 years old; English; single. Has worked on almost all grades of stock, and understands all well-known makes in worsted cards. Good references.

1903 **Boss Carder,** woolen or worsted mill, desires a position. Experienced on fine and coarse work; 27 years of ag ; American; married. Can refer to responsible parties Moderate wages desired. Will go to any part of United States.

1827 **Overseer of Woolen Card Room.** Has worked on blankets, robes, friezes, cheviots, kerseys, flannels, knit goods, cassimeres, hair lines and unions. Age 34; American; married. Wants not less than $3.00 per day.

1660 **Overseer of Woolen Carding.** Does not want to go out of N. E. States. Age 48; American; married. Many years' experience as overseer and has excellent references. Has worked on nearly every class of goods manufactured in N. E., and is familiar with nearly all machinery.

## COTTON CARDERS.

1886 **Overseer of Cotton Carding;** 31 years of age; married; of English parentage; desires position in the Middle, Atlantic or New England States. Familiar with Lowell, Pettee, Biddeford, Woonsocket, Whitin, Mason and all makes of pickers of above machinery. Good references.

1893 **Boss Carder of Cotton.** 38 years old; married; an American; who can also handle a weave room of from 300 to 500 looms, wishes to make a change. Has had over 15 years' experience in New England mills. Best of references.

1745 **Overseer of Carding Room.** Age 29; American; single. Has worked on all kinds of fine yarns. Excellent references and a first-class man. Will work for no less than $18 per week.

1884 **Overseer of Cotton Carding.** 42 years old; French; married; desires a position in any mill north of Pennsylvania. Long experience in several large New England mills. Familiar with all makes of English and American machinery. Best of references. Has one son in family, third hand in card room.

1759 **Overseer of Carding Room.** Age 26. Has worked on fine and coarse yarn, and understands all makes of machinery in carding Good manager of help by speaking different languages. At present overseer in a small mill. Excellent reference as to character and ability. Wants from $3.00 to $3.50 per day.

958 **Overseer of Cotton Carding.** 41 years of age; American; married. Understands all makes of English and American carding machinery. Can do his own grinding in a small mill, if necessary. Best of references.

## WOOLEN WEAVERS.

1645 **Overseer Weaving.** Age 30; married, American. Has worked in weave room since he was 17 years old, as weaver, fixer and secondhand of weaving, except for a short time was traveling salesman. Has worked on ladies' dress goods, men's fine worsted suitings, overcoatings, cloakings, etc., on Crompton & Knowles and Jacquard looms. Excellent references.

1878 **Woolen** Overseer of Weave room. American; married. Very large experience in New England mills, on union cassimeres, chinchillas, dress goods, meltons, kerseys, fancy woolen suitings, and government goods, also fine fancy worsted suitings. Knowles & Crompton looms. A 1 references.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1688 **Overseer of Weaving** in large mill, designer in small mill, or assistant designer in a large mill. Age 38; German; single. Has worked on beavers, chinchillas, fine cassimeres, fine fancy worsteds, ladies' dress goods, army goods, union cassimeres and other classes of goods. Strictly temperate and industrious.

1805 **Boss Weaver.** Has worked on fancy dress goods, cashmeres, ginghams, fancy worsteds, coatings, lenos and Jacquards. Has also some knowledge of designing. English; age 36.

1907 **Boss Weaver** or boss weaver and designer of woolens Also understands loom fixing. Would take a position in the West. Famil ar with all plain and fancy woolen looms. Age 33; American; single. Is strictly temperate. Best of references.

## COTTON WEAVERS.

1806 **Wanted a Situation** as Boss Weaver or Second Hand, on any kind of plain weaving in cotton, wool, or jute mill. Has had 10 years' experience as boss weaver and 15 years experience as second hand and loom fixer. Am a married man, sober, steady, a good manager of help and a hustler for good productions. Can give good references as to ability, sobriety, and character. Will go to any part of U. S., Canada or Mexico.

1738 **Overseer of Weaving.** Drawing in, Warping, Slashing, and all preparations, 14 years experience in colored mill in Manchester, Eng., and two years in this country. Age 37; English; married. Has worked on sateens, drills, dress goods, zephers, turkish towels, and can pick out own pattern for weaving and drawing-in. Understands the different makes of looms. Wants $3.00 per day.

1879 **Overseer of Weaving** or Assistant Supt. 17 years' experience in New England cotton mills, having charge of 1300 looms for 6 years recently. Fine and coarse goods on all well known machinery. Best of references.

1826 **Wanted by Steady, Industrious** man, a situation as overseer, in Tape mill. Has had considerable experience, but does not know everything, but willing to improve. $2.25 per day. Has been overseer a short time, and has perfect control of help. Age 46; English; married. No family. Would go anywhere, and settle.

## WOOLEN SPINNERS.

1691 **Boss Spinner.** Large experience in first-class N. E. mills on flannels and all kinds of fancy cassimeres. Englishman; age 50; married. Refers to past employers.

1784 **Worsted Drawer and Spinner.** Would take twisting. Age 2-; Englishman; single. Can furnish references as to ability and character.

633 **Woolen Mule Spinner** desires to move from Maine on account of wife's health. At present in good position. Age 37; married, Scotchman.

1862 **Overseer of Spinning.** Is used to Johnson & Bassett, Davis & Furber and Campbell & Clute machines. Has had 18 years' experience as an overseer. Is a handy man, and can give good references. Wool, cotton and mixtures.

1834 **Overseer of Spinning.** Experience covers eight years as secondhand and fixer and eleven years as overseer. Has handled nearly all kinds of goods. Is an expert fixer. Worked on Davis & Furber mules. Age 38; American; married.

1820 **Overseer in Woolen Spinning.** Has worked on ladies' dress goods, cassimeres, cheviots, beavers, all wool, and wool and cotton, and wool, cotton and shoddy mixes, from 1 run to 9. Davis & Furber Johnson & Bassett and Platt mules and jacks Refers to past employers. Wants $2.50 per day.

## COTTON SPINNERS.

1068 **Overseer of Frame Spinning,** Twisting, Spooling and Warping desires position and would accept that of second-hand. Has worked in some of the best mills in N. E. (37 years old, an American and single) on Nos. running from 4s to 80s. Is familiar with Whitin, Mason, Biddeford and Lowell machines. Will go to any of the N. E. or Middle States. A1 references, and does not expect a fancy price.

1869 **Overseer or Second Hand** of ring spinning, cone winding, twisting, spooling, cop winding, reeling. 27 years of age; American; single. Of good experience on fine and coarse cotton yarns. Competent and reliable and used to handling all the well known makes of machinery. Will go anywhere. Good references.

1779 **Boss Mule Spinner.** Now employed in South, but wants to change on account of climate. Has had 15 years' experience as a cotton spinner, working up to overseer from back boy. Is well acquainted with all makes of English mules, also latest Mason mules, and is familiar with the working of all drafts and twists. Married; 30 years old, and temperate.

1889 **Boss Spinner of Cotton.** 30 years old, American; married. Familiar with all classes of hosiery yarns and all makes of machinery; 16 years' experience. Wages expected $125 per month. Best of references.

1690 **Cotton Mule Spinner.** Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with.

## DESIGNERS.

1445 **Designer or Finisher,** or will take position as supt. of a small mill. German; Protestant; age 36; married. Has worked in several New England mills, and refers to them. Graduate of the Werden Textile School, Saxony. Has worked on kerseys, beavers, cassimeres, cheviots, etc. Is familiar with all makes of American and German machinery.

1838 **Designer,** assistant supt., assistant designer, overseer of weaving, secondhand large weave room, loom fixer, boss spooler, dresser, or mender Age 48; American; single. Worked on worsteds, cassimeres, dress goods, blankets, chinchillas, cloakings, etc. All patterns of Crompton & Knowles looms, Davis & Furber spooling, dressing and weaving machinery, and Worcester warp compressor.

1888 **A German Designer,** who understands all machinery necessary for the manufacture of men's wear, woolen or worsted, is open to a position at $3000 per year. Eight years' experience in Germany and five years' in one of the largest mills in the United States. 33 years of age, and single. Best of references.

1897 **A Young Man,** 28 years of age, competent to handle the designing for a cotton or silk mill, would like a position. Has made in cotton, plain, fancy and leno; in silk, tie silks, dress goods and linings. Looms all well-known makes. Is Scotch, and single 14 years' experience in weave room and designing room. Good references from N. J. and Conn. mills. Four workers in family—weavers.

1837 **Designer** in small mill, or assistant in large mill. Age 24; Scotch; single. Has worked on fancy cassimeres, plaid backs, coverts, unions, worsted trowserings and shirtings. Fair knowledge of Jacquard designing. Johnson & Bassett mules, Davis & Furber dresser, and Knowles looms. Is willing to work for moderate salary, with chance of promotion.

1789 **Designer,** or assistant supt. and designer. An A1 color designer. Can get up good line of fancy woolen and worsted goods which will be good sellers and profitable to the manufacturer. Graduate of a prominent designing and textile school in Germany. Is well posted on all kinds of stock, cotton and shoddy, and with the general work of a woolen mill.

1652 **Overseer Cotton Weaving.** Worked on about all kinds of cotton goods. Age 41, American, married. At present employed in the South, but wants to change for a healthier locality. Refers to present and past employers.

1599 **Assistant Designer.** A young man who is studying woolen and worsted designing would like an opportunity to get practical experience, and will accept very small wages Has worked in mill for two years as weaver on Crompton & Knowles looms. Excellent references as to character.

1685 **Boss Dresser or Assistant Designer.** Has taken a thorough course in designing, and is well up in calculations and in the making of fancy men's wear goods of all kinds. Has worked in Scotland and three years in this country. His knowledge of yarn calculations and practical experience as dresser tender makes him well fitted to fill a position as boss dresser and to run a room in an up to date and efficient manner, or to fill a position as designer or assistant.

## KNITTERS.

1889 **I would like** to correspond with some president of some cotton mill or large hosiery mill now running, or any new mill now under construction or proposed as to position of manager. I am a practical manufacturer of long experience and have just finished building and equipping one of the largest hosiery mills in the South. I am well posted on the manufacture of hosiery yarns and hosiery of all grades. Non paying mills can be put on paying basis under my management, if conditions are possible. Only object in leaving present position as general manager is climate is against his health.

1777 **Overseer of Knitting.** Has worked on ladies' and infants' underwear. Standard makes of machines. Will not change for less than $18. Age 33; American. Refers to past employers.

1906 **Supt. or Agent** of a hosiery mill is open to a position. Thoroughly understands spinning, dyeing and is familiar with all well-known makes of knitting machinery. American; 24 years old; single. Has been superintendent for the last seven years in a large plant. Best of references.

1744 **Fixer.** Age 24; American; married. Is familiar with Boss, Invincible, McMichael & Wildman, Brinton, Denny and Victor machines. Wants $15 a week.

1905 **Boss Knitter,** age 26 and married, with six years' experience on all kinds of Jersey ribbed knit ladies' underwear, would like to secure a position as foreman knitter in a small mill in Pennsylvania, or as assistant in a large one. Practical experience on Nye & Tredick, Stafford & Holt, McMichael & Wildman, Brinton and Champion rib machines; understands all kinds of sewing machines and repairs, also boilers and can run them on economical plan. Can do machine repairing in general, having had early training as machinist. Is strictly temperate, and can give references.

1831 **Boss Knitter** on circular latch needle machines, making ribbed underwear, or spring needle work made on Tompkins machine. Also a practical wool carder of about eight years' experience as overseer in underwear and shoddy mills. Understands raw stock and how to handle it so as to give best results. An American, steady and reliable. Age 36.

1554 **Boss Knitter.** Underwear, Jersey ribbed, lisle, wool, plaited work, silk Can handle any latch machine. Good references. Age 26; married.

1741 **Overseer of Knitting.** Has had 18 years' experience as overseer. Has worked on wool, worsted and cotton underwear; spring and latch needle machines. Age 33; married. Refers to past employers.

1749 **Boss Knitter or Fixer** wishes position. Eight years' experience on knitting machinery. Experienced on Standard, Mayo and Hepworth machines. Will accept position in any state.

1824 **Boss Knitter or Fixer** on ribbed underwear. Has worked on fancies, double knees and tops and plain work. Is familiar with Brinton & Denny, McMichael & Wildman, Huse and Pepper machinery Will work for $2.50 or more, according to position.

1776 **Boss Knitter.** Had constant experience in the knitting business for the past twenty years. Can handle any kind of goods made on a circular spring needle knitting machine. Age 36; American; married. Excellent references.

## FINISHERS.

1792 **Boss Finisher,** with over 20 years' experience on all kinds of woolen and worsted goods. Learned business in one of the best woolen mills in Scotland and has also had experience in some very good mills in this country. Strictly temperate and steady, and can give good references as to character and ability. Wants position in a good, steady-running mill at once. Age 38 years; married.

1887 **Overseer of Finishing** in a cotton or worsted mill, having several years' experience on cotton flannels, shirtings, blankets, crashes, cotton and worsted dress goods, and carriage cloths, is open to a position. 25 years of age; American; married, and strictly temperate. Will go to any part of the United States, except West. Best of references.

1902 **Overseer of Finishing,** 16 years' experience on woolens, worsteds and cottons, would like a position in Mass. or R. I. mill. 42 years old; American; married. Two boys in family who can run shears and press. Good references.

1900 **Boss Finisher** of men's wear, ladies' dress goods, worsteds, cassimeres, kerseys, cotton and woolen mixes, who has gained his experience as finisher in some of the large English and American mills, is open to a position. Is familiar with all standard makes of finishing machinery; 48 years of age; Scotch; married. Can refer to well-known men.

1909 **Boss Finisher** of worsted, woolen and cotton dress goods, and an expert examiner, would like a position. 25 years old; English. Long experience, and can refer to some of the largest finishing establishments in the East. One worker in family.

1804 **Overseer of Finishing.** Wants to change on account of town he is in Is familiar with all kinds of woolen and worsted machinery, and has worked on kerseys, cassimeres, carriage cloth, worsteds, dress goods, shawls, etc. Age 35; American; married. Wants $3.00 per day. Excellent references from past employers.

1632 **Boss Finisher** on fancy and piece dye worsteds, kerseys, doeskins, cassimeres, etc., and all kinds of knit goods. A man of unusually large experience for his age and well recommended Age 29; American. At present employed, but will change for $4 a day.

1526 **Foreman of Finishing Room,** Folding, Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1795 **Overseer of Finishing.** Has worked on cassimeres, cheviots, beavers, kerseys, unions, dress goods and worsteds, and is familiar with all makes of machinery. Wants [$2.50 per day. Age 43; American; married.

1770 **Overseer of Finishing,** or would take secondhand position in large mill. Age 35; married; American. Cassimeres, cheviots, kerseys, meltons, chinchillas, dress goods and cloakings. Is familiar with all makes of machinery in woolen mills.

1771 **Boss Finisher,** or would take good secondhand position. Has worked on all classes of goods. Age 53; Scotch; married. Reason for his wishing to change is on account of mill where he is now employed not running steadily.

## DYERS.

1846 **Boss Dyer** or Bleacher. Age 28; English; married. Has worked on mostly all kinds of dyed and bleached goods. Understands indigo blues and alizarine colors for bleaching and fulling purposes on cotton goods. Wants to change as place he is in does not agree with him.

1303 **Manager of Dye Works**, or boss dyer, who has been connected with some of the largest dye houses both in England and the United States is open to a position. Understands piece dyeing of all kinds, cotton, wool, mohair and alpaca; pile fabrics; knit goods, wool and cotton; yarns, wool, silk and cotton; raw stock; and wool and merino shoddies Is 36 years old; English; married. Good references from a number of prominent men in the textile industry.

1839 **Boss Dyer,** English, age 35, married. Has been boss dyer for 14 years in this country and England on all classes of woolen and cotton warp goods, such as satinets, cloakings, and shoddy, and is well up in dyeing light shades out of dark stock. Understands worsted piece dyeing, raw stock and worsted yarn. Steady and reliable, and best of references. Would work for fair pay.

1894 **A Competent** cotton dyer, experienced on long chain, short chain, skein yarn, and raw stock, is open to a position. Age 48; Scotch; married. Will accept reasonable wages. Has good references.

1883 **A Boss Dyer** who understands cotton and wool raw stock dyeing, piece dyes, knit goods, and has had large experience on cotton skein yarns for the webbing trade, is open for a position. 34 years old; married, and an American. Will accept a reasonable salary.

1908 **Boss Dyer and Bleacher.** Age 23; American; single. Now employed, but will change for good job. Best of references from present employers.

1781 **Boss Dyer and Finisher.** Age 20; Scotch; single. All wool and cotton mixed blankets, fine and coarse flannel. Some cassimeres and shoddy goods. Refers to past employers.

1427 **Second Hand Cotton Piece** Dyer. Age 38. Married. Worked on canton flannels, sateens, drills, ducks and all kinds cotton piece goods Was 12 years in one mill as second hand. At present employed but can leave at once. Well recommended.

1850 **Head Dyer** on cotton yarn or cloth, or would take a position as chemist, sample dyer in an aniline manufacturing company, or dyestuff salesman. English; 26 years old; married. Strictly temperate, and can furnish references.

1561 **Boss Dyer**, with long experience on all kinds of worsted, serges, cloakings, flannels, repellants, kerseys, also all wool, cotton and silk. Best of references Age 35; married.

1513 **Boss Dyer.** Age 35; married; English Has worked on underwear, piece dyes, raw stock and mercerized goods. Is acquainted with all makes of dyeing machinery.

1704 **Boss Dyer.** Age 36; English; single. Is familiar with dyeing cotton yarn and warp both for bleaching, fulling and other purposes. Has dyed for the best firms in England, also for export work.

1684 **Dyer.** Age 30. Been in business 12 years. Wants position at once. Will go anywhere. Is familiar with long chain, short skein and raw stock dyeing, and carpet warp.

1664 **Boss Dyer.** Age 40; Scotch, married, 14 years' experience as boss dyer. 20 years in all at trade. Has worked on wool, cotton, ramie, worsted, shoddy and union waste dyeing for overcoatings, linings, tweeds, cassimeres, plaids, flannels, and ladies' wear, also on all wool and union piece dyes, hosiery, knit goods, yarns, slubbing. Is practically familiar with scouring, bleaching, carbonizing, speck dyeing and mill soap making.

1778 **Dyer of Wool, Felt,** etc. Age 25; American; married. Refers to past employers.

875 **Overseer of Dyeing.** Age 34; American; single. All classes of wool, woolen and worsted yarns, indigo on worsted yarn and piece dyeing. Not at present employed, and can take position at once. Wants $3.00 per day.

1484 **Woolen Dyer.** Has had a large experience and can furnish the best of references. Age 47. Does not wish to go South or West.

1199 **Dyer** wants position on fancy cotton skein yarns, long and short chains. Has thorough knowledge of alizarine and indigo blue dyeing. Also fancy piece dyeing. Has 20 years' experience. Can give first class references.

1626 **Dyer and Finisher,** with experience on plushes, dress goods, mohair and worsted genapped yarns, cotton and woolen yarns, raw stock. At present employed, but will consider position paying $3 a day.

1864 **Boss Dyer.** Age 34; American; married; desires a position. Has had good experience on wool and cotton mix goods. Employed at present but could take new position in about one week. Good references.

1860 **A First-Class Boss Dyer** wants position. 50 years old; German; single. Has managed some large New England dye houses and is familiar with worsteds, woolens, mohairs, knit goods, pieces, yarn, slubbing, loose wool, carpet yarns and cotton yarns Will go anywhere and can give references that will satisfy anyone as to his ability.

1821 **Boss Dyer.** Age 35; American; married. Worked in hosiery dyehouse for seven years as boss dyer. Has had experience on fast black, lisle finish and extract work.

1809 **Boss Dyer.** Age 33; American. Wants $3.50 per day or more. Wants to change on account of locality. Has worked on fancy cotton yarns, mohair novelty yarns, worsted yarns, raw cotton, raw wool, piece dyes on flannel, mixed cotton and wool and all wool, kerseys and beavers and beavers with cotton warp.

1846 **Boss Dyer** or bleacher. Age 28; English; single. Has worked on mostly all kinds of dyed and bleached goods. Wants to change as place he is in does not agree with him.

## MISCELLANEOUS.

1803 **Roll Coverer.** I have done the work for a number of the largest cotton and worsted mills in this country, and am well known throughout the trade. Have been in the business 35 years, and can furnish stock and tools. Would be glad to take piece work, if shop is furnished, or would take a place by the day. Can furnish best of references.

1762 **Chemist.** Age 23; American. Wants a position in dye works, print works or bleachery. $15 a week to start on. Excellent references.

1835 **Beamer, Twister,** also understands drawing in and splitting. Age 27; American. Has worked on ginghams, dress goods, shirtings and cotton worsted.

1851 **Machinist in Woolen Mill.** Can repair looms, cards, mules, etc., of every description, also worsted machinery. Understands forging tools and has fair knowledge of electricity. Ten years experience in some of the best mills in New England.

1873 **Wanted** situation as Master Mechanic in cotton corporation. Has had large experience. Middle aged; strictly temperate. A graduate of a technical school. Learned carpenter's trade and machinist's.

1895 **Shipping Clerk** and Bookkeeper, familiar with mill office work, would like to take a position as such in any part of United States. 21 years of age; single; an American. Best of references.

1865 **Machinist and Fixer.** Has had eight years' experience. 24 years old; English; single. Is thoroughly familiar with Singer, Wheeler & Wilson, Merrow, Union Special, Lamb, Pepper, and Hepworth and Beattie loopers

1873 **Master Mechanic** in cotton corporation. Has had large experience. Middle aged; strictly temperate. A graduate of a technical school. Learned carpenter's trade and machinist's.

1866 **Overseer of Burling** and Sewing or Cloth Examiner in commission house. Have had 25 years' experience in the cloth room and can handle any class of woolens or worsteds, either dress goods or men's wear. 41 years old; Irish; married. Best of references. Have a son 19 years old who is a percher and brusher.

1881 **Paymaster or Bookkeeper.** Agent or Manager Wood or Iron working plant or small cotton mill. 28 years' experience. Expert accountant. Can take charge of all the office work in large factory or do all myself in small factory. Good references. Will go anywhere in New England or Middle States.

1885 **Chief Engineer,** or master mechanic; 20 years' experience in large Massachusetts and New Hampshire cotton mills, is open to a position in any part of the United States. 39 years old; married, and an American. Understands all modern makes of motive machinery, including engines, boilers, pumps, electrical machinery, etc. Good references.

1473 **Overseer Steam Gigging and** Boiling. Has worked for many years in large mills. Would accept $2.50 a day at start. Age 33, married.

1489 **Boss Finisher.** Second hand or Boss shearer. Well experienced; excellent references. English; age 27; single.

1538 **Master Mechanic.** Age 41; married; American. Is acquainted with all makes of looms, cards, pickers, frames, etc. At present employed, but wishes to better himself. Refers to present and former employers.

1404 **Chief Engineer and Machinist.** A man who is fitted by education and experience to take charge of a large plant. Well acquainted with all kinds of mill machinery. Has had charge of erection of steam, water and electrical plants, pumping machinery and cotton mill equipment. Would be an excellent man to superintend the erection of a new plant and economical operation of same.

1817 **Chief Engineer or Master Mechanic.** First class man for a cotton mill. Has been employed as machinist in various cotton mill repair shops, and in repair shops building new cotton machinery. Proficient as a draftsman on mechanical drawing. 31 years old; married.

1764 **Engineer and General Repair Man.** Age 45; American; married. Wants $2.50 to $3.00 a day. Over twenty years' experience.

1418 **Secretary** in superintendent's or office of overseer of weaving. Is familiar with books in use in all departments. At present, makes out orders for goods from raw cotton, and follow to finished goods ready for shipment. Also keeps up stock of supplies of all kinds. Has re-arranged shipping and warehousing. Introduced and worked out his present system for running mill, which has proved successful.

1667 **Overseer of Slashing, Spooling,** Warping and Drawing in. Age 39, and married. Has worked on all kinds of spoolers, warpers and slashers. Now employed as boss of slashing and drawing in, but is capable of handling a larger job than present one. Can furnish excellent references as to character, ability, etc.

1731 **Young Man of 32 desires to go** to Japan. Is temperate. Been twenty years in cotton mill and has had experience on many kinds of looms, including Draper. Has best of references. Holding a good position in mill now.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines, 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1826 **Wanted by Steady, Industrious** man, a situation as overseer, in Tape mill. Has had considerable experience, but does not know everything, but willing to improve. Would start at $1.25 per day for six months. Has been overseer a short time, and has perfect control of help. Age 46; English; married. No family. Would go anywhere, and settle.

1726 **Superintendent** broad silks from time of leaving weave room till ready for consumer, piece dye cotton and silk mixtures included, or will accept overseership in any department connected with above. 35 years old; American; married. Is familiar with most all machinery used in this branch.

1819 **Overseer or Second Hand** of Knitting. Am 27, married, and an American. Have worked on silk, worsted, lisle, cotton and fancy mixed yarns. Understand Scott Williams, Snyder & Fisher, or any latch needle machines. Will work for reasonable wages and go anywhere in N. E. and Middle States. Best of references.

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**THOS. H. DOANE,** 233-225 MONROE STREET, CHICAGO.

MANUFACTURERS' AGENT.

*SELLING DIRECT FROM MILLS.*

Woolen and Cotton Accounts Solicited. Ample Room for Storage.

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Cones, Cops, Warps, Skeins,
Single, Double, Three-ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.

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Plans and Specifications furnished for the Construction and Equipment of Cotton Woolen and Carpet Mills, Bleacheries and Dye Works.
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A fine Textile Course by mail. Situations secured. Write at once for full particulars.
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Steady and remarkable success has attended the mills located on the Southern. It is the great Textile Line of the South. Mill Men and Mill Investors should investigate the advantages our districts afford.

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Mining and oil company's stock usually costs the actual cash investor from ten to many hundred times as much per share as the promotors pay for their stock.

Even with this handicap, some mining and oil stocks actually pay remarkable dividends to the real cash investors.

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in such enterprises are in the discovering, buying or developing of a prospect, and in making of that prospect a proven mine or oil producer which can be operated as a business enterprise, or can be sold for very many times its cost.

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Well-directed exploration, expert and development work often demonstrate values amounting to hundreds of times their cost.

The great disadvantage to most mining companies result from methods of promoting described in our circular, and methods which this proposed company seeks to avoid.

No swindling contracts or promotors' reservations are concealed or contemplated in this enterprise.

We ask you to unite with us in organizing a parent company, which intends to employ its own experts to explore, expert, develop and operate mining properties or similar enterprises. We invite you to join with us in being your own promoter.

Officers will be elected by the actual cash investors, as soon as sufficient capital is conditionally subscribed to justify the organization.

We intend to do our own exploring, experting and development work in a thoroughly honorable manner, so that the stock of sub-companies promoted by this proposed parent company shall have a foundation of proven value.

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## —IN—
# YARNS AND FABRICS.
## By FRED BRADBURY,

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This work, as its title indicates, treats of the many calculations relating to yarns and fabrics, and, while giving rules and clear explanations, supplements them by examples taken from actual practice.

The first chapter is devoted to the various systems of yarn numbering, and contains comparative yarn tables of the different systems in use, and methods are given for calculating the equivalent of any size by the other systems, and 24 practical problems are added.

Chapter 2 treats of the counts resulting from a combination of two or more threads of the same or different sizes, and 27 problems are included.

Chapter 3 is on the relative weights and cost of twist and mixture yarns, including boucle, corkscrew and other fancy yarns; 26 practical problems are given on this subject.

Chapter 4 is entitled, Weight and Cost of Warps and Weft in Hank, Ball and Otherwise, and includes 16 problems illustrating the various questions likely to arise in practice.

Chapter 5 treats of the various systems of counting reeds and healds, and is accompanied by 20 practical problems.

Chapter 6 deals with the weights of warp and filling in fancy woven fabrics, the number of ends and weight of each color, and handles the complex problems with unusual clearness, and 18 questions are given to illustrate the subject.

The weight and cost of woven fabrics receive attention in chapter 7, and chapter 8 treats of calculations involved in the reproduction of woven fabrics. This branch of the subject is well handled and the problems given add much to the value of this chapter.

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The whole aim of the book is to bring the subject right home to the mill manager and operative and will supply a need which the trade has long felt. It is a book which should be in the possession of textile workers for ready reference as the varied problems in mill work come up for solution.

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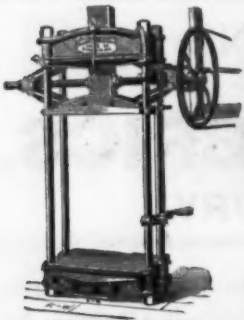

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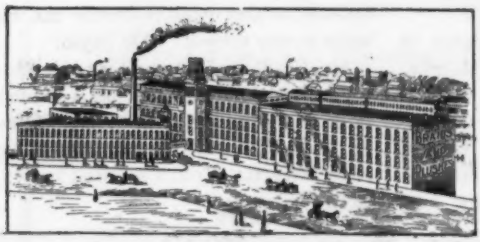

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Mohair and Worsted

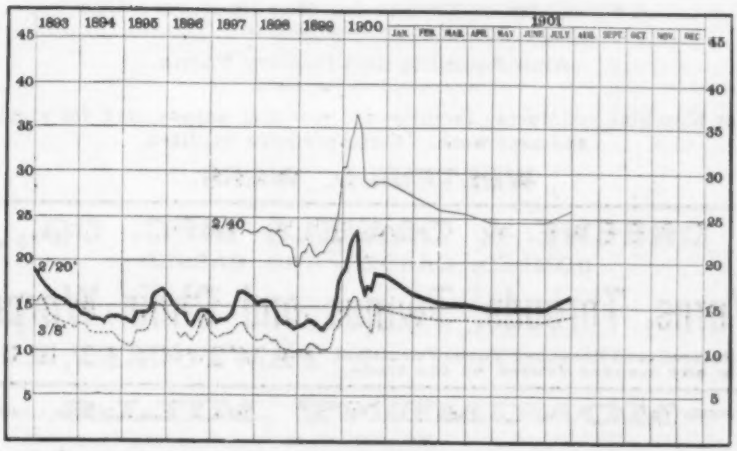
# YARNS.

Mohair Plushes,
Worsted and Cotton Braids.

D. COFF & SONS, Pawtucket, R. I.

ESTABLISHED 1861.

# YARN DEPARTMENT.




GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

## Cotton Yarn Market.

It is gratifying to be able at last to note an improvement in the market for cotton yarn. This improvement has taken place chiefly in the medium and low grades of yarn, which have been more depressed than the higher counts. The change is due in a great measure to the restriction of production by Southern mills. Prices have reached a level below which it was practically impossible for them to go, as the quotations were below the cost of manufacturing, and the mills had reached a point where it was a choice between higher prices or shutting down.

The improvement has not been in evidence in the shape of large orders, but rather in the advance in quotations and negotiations on the part of weavers and knitters for future deliveries. It is not, however, expected that any great or rapid advance will take place, as both the knitting and weaving trades are far from being in a satisfactory condition. The knitting business is particularly dull, and not until the consumer of the goods sends business to the retailer, will the trade in yarn return to a really healthy condition.

There has been but little change in the market for fine yarns. Throughout the depression these goods have been held firmly owing to the absence of large stocks on hand. We quote:

EASTERN YARN.

Mule Spun on Cops.

| | |
|---|---|
| 10s | 15½ to 16½ |
| 16s | 17 to 17½ |
| 20s | 18 to 18½ |
| 22s | 18½ to 20 |

Skeins.

| | |
|---|---|
| 10s | 13 to 13½ |
| 20s | 15½ to 16½ |
| 16/2 | 15 to 15½ |
| 20/2 | 15½ to 16½ |
| 30/2 | 18½ to 19½ |
| 40/2 | 23½ to 25 |

## Philadelphia Market.

There has been an advance in two ply yarns the past two weeks, and there is a much stronger feeling in knitting yarns. The price on this yarn has advanced ½c. to 1c.

There has been considerable inquiry for yarn for future delivery, and customers are willing to pay the advanced prices, to cover their wants.

The advance has been more apparent in frame spun yarn than in mule spun, probably because these were sold on a lower basis than the better yarn.

Prices are about as follows:

SOUTHERN FRAME YARNS.

Cones.

| | |
|---|---|
| 6s to 8s | 13 to 14 |
| 10s | 13½ to 14½ |
| 11s and 12s | 14¼ to 14½ |
| 14s to 16s | 14½ to 15 |
| 18s | 15 to 15½ |

# W. Warren Thread Works,

**SPOOL COTTON**
on 100 to 12,000 yd. Spools or Tubes.

A Specialty of Thread for Manufacturers Use
on Spools, Tubes or Bobbins.

Also Seaming and Hosiery Yarns
on Cones, Tubes or Skein.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

**WESTFIELD, MASS.**

## GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

## Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. **PAWTUCKET, R.I.**

## MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist, **COTTON WARPS**

**HOUSATONIC, MASS.** 4s to 80s.

## BARNESVILLE MFG. CO.

**BARNESVILLE, GA.**

**HOSIERY AND UNDERWEAR YARNS,**
Peeler, Bleached, Egyptian or any colors desired. Also,

**FINISHERS AND BLEACHERS**
of piece goods, underwear, towels, yarns, etc.

THE ONLY USERS OF JACKSON'S FORMULA OXIDIZED BLACK FOR HOSIERY.

We solicit your patronage. Work Guaranteed.

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**Indian Orchard, Mass.**

**Manufacturers of - - - -**

**COTTON WARPS AND YARNS**
In gray and all colors, single or in any twist.

**NOVELTY YARNS**
In Cotton, Mercerized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.

We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.

## Carded and Colored Cotton for Mixing With Wool

Machined, or in Roving.

| | |
|---|---|
| 20s | 15½ to 16 |
| 22s | 16 to 16½ |
| 24s | 16 to 17 |
| 30s | 18 |
| 40s | 25 to 26 |
| 50s | 31 to 33 |

GOOD MULE SPUN YARN.

Cones.

| | |
|---|---|
| 10s | 15 to 15½ |
| 14s | 16 to 16½ |
| 16s | 16½ to 17 |
| 18s | 17 to 17¼ |
| 20s | 17½ to 18 |
| 22s | 17½ to 18½ |

Warps.

| | |
|---|---|
| 14s to 16s | 14 to 14¼ |
| 20s | 14¼ to 14¾ |
| 26s | 15 to 15½ |
| 14/2 | 14 to 14½ |
| 16/2 | 14½ to 15 |
| 20/2 | 15 to 15½ |
| 24/2 | 16 to 16½ |
| 30/2 | 18 to 18½ |
| 40/2 | 24 |

Skein.

| | |
|---|---|
| 10s to 12s | 12½ to 13 |
| 14s to 20s | 13½ to 14½ |
| 22s | 14½ to 15 |
| 14/2 | 13½ to 14 |
| 16/2 | 14 to 14½ |
| 20/2 | 14½ to 15 |
| 30/2 | 17½ to 18½ |
| 40/2 | 22 to 24 |

## Woolen Yarns.

Spinners of woolen yarn are fairly well employed and will continue to be during the rest of the season. The yarns being manufactured cover a wide range from cheap yarns for overcoatings to yarn for fine wool hosiery. Merino yarn for fleece goods and yarns for weavers of cloth are quiet. The mills manufacturing light weight flannels are very busy and cashmeres are doing well.

In the woolen underwear business the mills were never in such a bad state; many of them are only running ¾ time, and are running out of orders, unless there are orders forthcoming soon there will surely be a shut down all along the line. This may be changed within the next 30 or 60 days because the business that is going is mostly on light weight balbriggans, and buyers cannot get these goods delivered quick enough. When orders are placed, it is generally by wire with the request that the first deliveries be forwarded by express. Noils are very scarce and high. Many knitters are putting in garnetts that they may use to advantage fine Australian thread waste. The difference between the talk of wool dealers and wool buyers is very marked. The dealer will tell you in glowing terms what Montana wool is selling for in the West, while the buyer will say that he does not care what the dealers are paying for wool, that he is not interested.

Manufacturers of underwear state that their salesmen on their first trips have been unable to interest customers and that another trip will be necessary; the


# New England Cotton Yarn Co.

NEW BEDFORD, MASS.

JAMES E. STANTON, Jr., Agent.

*Branch Offices:*

*ALBANY: 38 State Street. . . . . E. A. VAUGHN, Manager.*
*BOSTON: 77 Bedford Street . . . . . J. B. JAMIESON, Manager.*
*NEW YORK: 346 Broadway . . . . . P. H. CORR, Manager.*
*PHILADELPHIA: 213 Chestnut Street . . . . P. H. CORR, Manager.*

**Mule Spun Hosiery Yarns,** Carded and Combed.

**Colored Yarns,** Solid, Mixes and Randoms.

**Spinners of Cotton Yarn**

**Frame Yarns,** Single and Twisted, Carded—Combed—Bleached

**Fine Yarns,** For Electrical Purposes

**All Numbers 4 to 200.**

From **American Peelers, Sea Island, Peruvian and Egyptian Cotton.**

BENNETT, HOWLAND, ROTCH, N. B. SPINNING, COHANNET, NEMASKET, GLOBE, SANFORD, } **650,000 Spindles.**

*Entire product sold direct to consumers through the Company's own offices.*

CAPACITY, 50,000 Spindles.

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FITCHBURG MASS.

COMBED OR CARDED

## COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

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The "Drosophore" and "Vortex" Humidifiers.

Over 20.000 of our HUMIDIFIERS in operation.

Highest award on the Recommendation of The FRANKLIN INSTITUTE for

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**WHITE AND COLORED WARPS,**

6s to 50s—Single and Ply.

**MULE COPS,**

from 30s to 50s from

**AMERICAN AND EGYPTIAN COTTON.**

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Manufacturers of

**Mercerized Cotton Yarns.** GIVES THE HIGH SILK-LIKE LUSTRE IN KNIT GOODS AND WOVEN FABRICS

**Novelty Yarns.** BOUCLE, BOURETTE AND SPIRALS, IN COTTON, WOOL WORSTED, MOHAIR AND SILK.

**Cotton Warps.** ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST COLORS AND PRINTED.

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**FANCY HOSIERY YARNS**
IN ALL COLORS.
New York Mills, Oneida Co., - N. Y.

**JAMES E. MITCHELL & CO.,**
COMMISSION MERCHANTS.
**COTTON YARNS**
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SOLE AGENTS FOR
Lawton Spinning Co., - Providence, R. I.

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MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
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CONWAY, MASS.

**GRANT YARN CO.,**
COMBED AND CARDED COTTON.
**YARNS** 40s and above. AND
FITCHBURG, MASS. **WARPS**

COTTON, WORSTED, WOOLEN, MERINO AND FRENCH SPUN YARNS
Mercerized Cotton a Specialty
Write for Samples.
E. A. MORGAN,
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Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
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Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

**C. MOORE & CO.,**
MANUFACTURERS OF
**TWINES, THREADS AND YARNS.**
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

buyers have been so much interested in getting in the light weight business that they have not taken the time to talk on heavy weight or medium weight garments, but there is no doubt that as the season progresses, the business will broaden.

## Worsted Yarn.

The present is a very complicated market, full of contradictions. Some weavers are very busy and have ordered yarns freely; others have only a moderate amount of orders. The mills manufacturing clay worsteds, cheviots, serges and undressed worsteds have the bulk of orders and, added to this, here and there is a manufacturer who is making a cheap all wool fancy worsted.

We know of one concern manufacturing clays and fancy worsteds in two separate mills; the clay mill has orders which will last fully eight months, while the fancy worsted mill is scarcely running. On one hand you hear of manufacturers who are obliged to turn down orders, and on the other there are mills and plenty of them who refuse to buy yarn because of a lack of orders.

The worsted spinners on some lines have all the orders they can handle, while other spinners are not doing as well. The busy concerns are making yarn out of a grade of wool between a quarter and ⅜ Bloods; the dealers in worsted wools are having good orders for these grades.

The salesmen for weavers who have not secured a full complement of orders are casting around for yarn which will produce the results which their successful rivals have reached and, when the yarn is found, it cannot reach them fast enough.

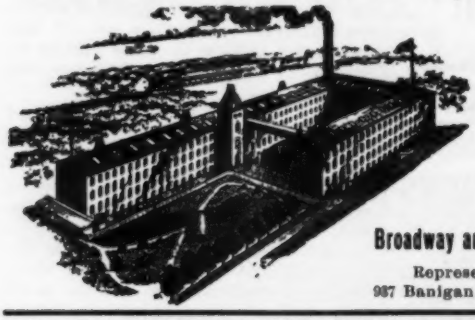
Some of the spinners with stock yarn are keeping it out of the market anticipating an advance. We do not look for this because the market has narrowed down to piece dyed fabrics.

We hear of some clothiers offering to pay an advance to get certain lines of cloth and weavers turning them down because they cannot fill the orders at any price, while on other lines there is no interest shown. Unless as the season advances the market broadens there will be a demand for only certain kinds of yarn. The knitters of hosiery state that these goods are always one month behind cloth mills; on this basis business for hosiery requiring French spun worsted yarn should start up the middle to last of August.

We quote as follows:

| | |
|---|---|
| 2/40s Australian | 85 to 90 |
| 2/40s Delaine | 85 |
| 2/40s half blood | 76 to 80 |

## HOWLAND CROFT, SONS & CO.



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**Fine Worsted Yarns**

OFFICE AND MILLS:

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Represented by FIRTH BROADHEAD,
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## ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

FINE FRENCH SPUN

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.

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Worsted and Mohair Yarns — white or colors, in skeins, on spools, cones, or shuttle bobbins.

**NOVELTY YARNS** — of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

**CENAPPED YARNS** of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

...Dyers of Yarn and Slubbing...

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FRENCH SYSTEM. BRADFORD SYSTEM

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MANUFACTURERS OF

Worsted and Woolen Yarns

OFFICE AND MILL: Delaware and Cooper Streets. CAMDEN, N. J.

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MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

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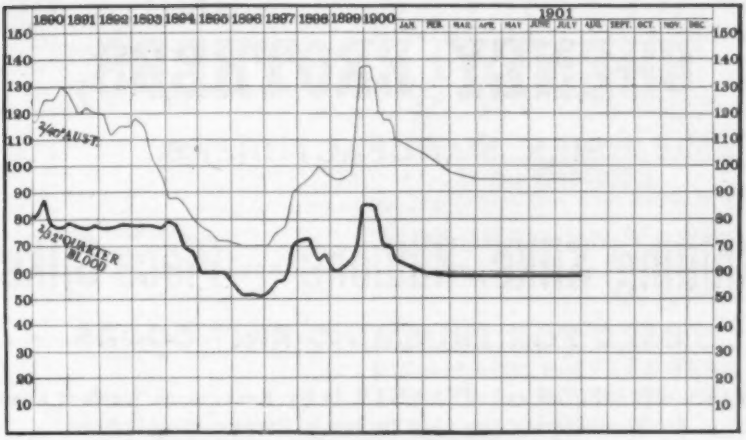


CHART SHOWING RANGES OF PRICE OF WORSTED YARN.

| | |
|---|---|
| 2/30s quarter to ⅝ blood | 60 |
| 2/36s quarter blood | 60 |
| 1/40s half blood, French spun | 75 |
| 1/30s half blood, French spun | 70 |

## The Shoddy, Waste and Rag Market.

There has been very little change in the shoddy situation during the past month, and although there has been some scarcity of white stock, the demand has not been great enough to stiffen the backbone of the market. This applies more to the finer grades than to low, white stock. Fine light merinos and fine darks led in the sales during the first half of this period, and what call there is still continues along those lines. Steady prices have characterized the month, owing probably to the steadiness of the rag market and to the fact that many of the cloth mills are doing a fair business. They have bought from hand to mouth, but with slightly increased volume, and

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ALL KINDS OF

## Knitting Silks, Ribbons AND Piece Silks,

**USED FOR TRIMMING KNIT GOODS.**

**TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.**

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## WILLIAM RYLE & CO.,

DEALERS IN

**Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic**

## SPUN SILK YARNS AND NOILS

**Importers of European and Asiatic Raw Silk.**

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**DAN'L MASON,**
Voorhis Mills, PATERSON, N. J.
**BUYS JOB LOTS** in colored and raw
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Cash Advances on Sales and Prompt Returns.

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Selling Agent for—
Bristol Worsted Mills,
Highland Worsted Mills.
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## COTTON YARNS

from 2s to 26s single and ply.

**SPECIALTY—FIRE HOSE CORD**

and Yarns put up on tubes wound on Universal System.

*WHITTIER MILLS, - - - Springfield, Mass.*

do not seem inclined to buy in ahead for the light weight season, as has been hoped. Even on heavy weights, there seems to be but little demand for shoddies, and that little is for the stocks above mentioned.

NOILS AND WOOL WASTE.

There has been very little demand for noils, and prices of a month ago remain practically unchanged. A limited supply will, however, undoubtedly cause a firm market, and hold prices up to their present point; due more to the fact that the worsted mills have not been as large producers of yarns recently, than to anything else. Wool wastes are very quiet, with the exception of some of the fine white stocks, where there is rather more demand.

RAG MARKET.

The rag market still remains quiet, although there is and has been some movement in the finer grades of clips. This is also true of soft woolen rags, in the finer grades of which almost all the deals have occurred. There is scarcely any demand for low stocks. Many mills are still running on heavy weight goods, either the original orders or new orders of this class, which accounts for the steady, though hand to mouth call for the above lines of rags. To our knowledge, no orders have been placed to meet the demands of the light weight season, there seeming to be no speculative tendency showing in today's market, although there will probably be a change for the better in the course of four or five weeks.

---

**SHODDYS AND EXTRACTS.**

| | |
|---|---|
| White yarn, best all wool | 37-40 |
| White knit, all wool, best, fine | 28-32 |
| White knit, No. 2 | 25-28 |
| Light yarn, extra fine | 25-28 |
| New pure indigo blue | 23-25 |
| Fine worsted, new black | 24-26 |
| New blue clip, best, fine | 20-22 |
| Brown, fine | 16-19 |
| Dark mixed, extra fine and free | 22-24 |
| Dark mixed, No. 1 | 17-20 |
| All wool yarn, medium and coarse grades | 18-20 |

*MERINO.*

| | |
|---|---|
| Fine light, all wool, No. 1 | 23-25 |
| Medium light, all wool, No. 1 | 15-17 |
| Medium light, all wool, No. 2 | 14-16 |
| Fine black, all wool | 19-20 |
| Fine dark, all wool, No. 1 | 17-19 |
| Medium dark, all wool, No 1 | 13-15 |
| Medium dark, all wool, No. 2 | 12-13 |
| Red knit stock, strictly all wool | 19-20 |
| Red flannel, all wool | 18-20 |
| Dark blue for hosiery, strictly all wool, No. 1 | 17-20 |
| Dark blue for hosiery, not all wool, No. 2 | 12-14 |

DELAINE EXTRACTS.

| | |
|---|---|
| Light | 17-19 |
| Medium light | 15-17 |
| Regular grey | 12-15 |
| Black | 13-15 |
| Fancy colors | 16-20 |


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**Silkine also Lisle Silk**

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Two and Three Ply, for All Purposes,

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Mercerized, Turkey Red, Gassed } Cotton Yarns.

Jacquard and Harness Twines.

**Buckingham, Paulson & Co.,**

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COTTON YARNS of all Descriptions.

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Colored Cotton Hosiery Yarns, Double and Twist Yarns for the Weaving Trade.

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Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted. Cable Cords and Twines.

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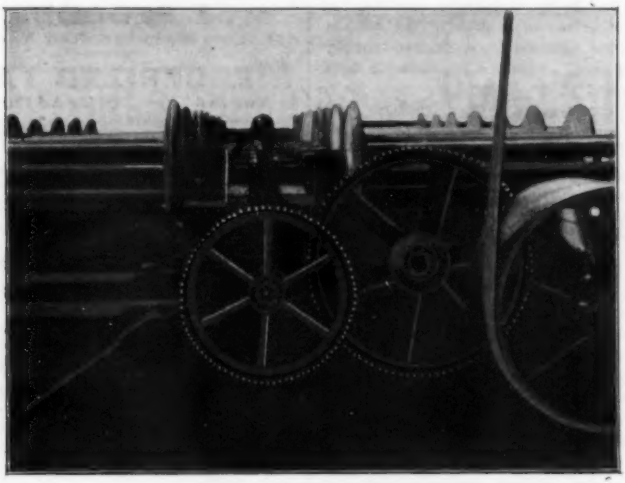
**Woolen Yarns**

for Knitting and Weaving, also Wool Spun Cotton Yarns. Equipment first class, practical experience, small expenses, and low prices. Will take work on commission.

UNIONVILLE, CONN.

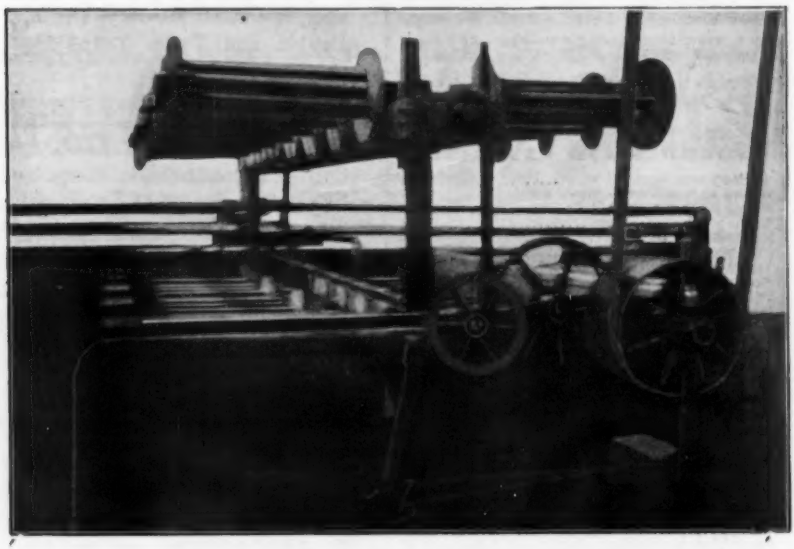
# A NEW DYEING MACHINE.

**The invention of a practical dyer who is using it with perfect success.**
**It is simple, very much cheaper than other machines, does uniform work, and requires no attention.**



FRONT VIEW. WORKING APPARATUS DOWN.

**Adapted for Dyeing and Scouring Woolen, Cotton, Worsted or Silk Yarns in Skein.**



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Natural, Colors, White and Fast Blacks, in Numbers 3/2s to 200s, two ply.

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☞Turkish Towels made up to suit the trade and shipped to any point.

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Correspondence solicited.


| WOOLEN RAGS. | |
|---|---|
| Fine merchant tailors, all colors | 8-9 |
| Choice light colors | 10½-11½ |
| Browns | 12-13 |
| Blacks | 9-10 |
| Fine blues, plain | 10-11 |
| Fine dark | 10-11 |
| Medium dark | 6½-7½ |
| *WORSTEDS.* | |
| Blue | 15½-16½ |
| Black | 18-20 |
| *SERGES.* | |
| New blue | 14-15 |
| New black | 16-18 |
| *FLANNELS.* | |
| New scarlet | 17½-18½ |
| New blue | 15-16 |
| Clonkings | 3-4 |
| **SOFTS AND KNIT STOCK.** | |
| Soft woolens, best | 5½-6 |
| Old white flannels | 17-18 |
| White flannels, No. 2 | 11-12 |
| Old red flannels | 9-10 |
| Light blue flannels | 7½-8½ |
| Old blue flannels | 6½-7 |
| Old plaids | 5-7 |
| White stockings | 20-22 |
| White hood stock | 21-22 |
| Clear hoods | 8-9 |
| Red Stockings | 9-11 |
| Blue stockings | 9-11 |
| Fancy stockings, No. 1 | 7-9 |
| Grey stockings | 8-10 |
| Black stockings | 8-9½ |
| Knit stock comforters | 7½-8½ |
| Red knit | 9-10 |
| Light grey knit | 7½-8 |
| New light fancies | 14-15 |
| New fancies | 11-12 |
| *MERINOS.* | |
| Light, fine | 12-14 |
| Light, coarse | 6½-7 |
| Fine dark | 8-9 |
| Dark, No. 2 | 5-6½ |
| Coarse dark | 4-5 |
| Blue | 10-11 |
| Blue—seamed | 12-14 |
| Black—unseamed | 9-10 |
| New black | 18-20 |
| Small | 3-4 |
| Bunting | 6-8 |
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| Australian | 48-55 |
| Fine domestic | 40-45 |

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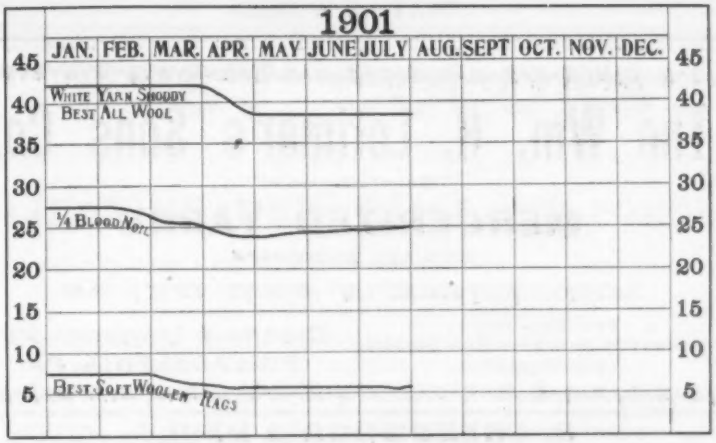


CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS, AND NOIL.

| | |
|---|---|
| ⅛ Blood | 35–40 |
| ⅙ " | 2?–30 |
| ¼ " | 25–26 |
| Braid | 22–25 |
| Carpet (white) | 14–18 |
| Carpet (colored) | 10–12½ |
| *SEEDY.* | |
| ⅛ Blood | 25–30 |
| ⅙ " | 20–25 |
| ¼ " | 17–20 |

**FLOCKS.**

| | |
|---|---|
| Shear, fine white, all wool | 13–15 |
| Fine indigo blue, all wool | 9–9½ |
| Fine black, and blue, all wool | 7½–8 |
| Fine dark, all wool | 6–6½ |
| Gig, fine, all wool | 3–4 |
| No. 1, black, all wool cut | 5–6 |
| All wool, fancy, shear and gig | 2½–3½ |


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Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
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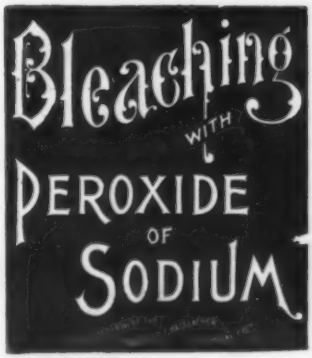


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DOUBLE STRENGTH. UNEQUALED FOR DEPTH OF SHADE.

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for raw cotton, yarns, warps and piece goods; indestructible by light and acids, absolutely fast to scouring.

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for all kinds of fabrics, dyeing perfectly level shades. Aniline Colors for cotton, wool, silk, paper and leather.

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Adopted by leading mills everywhere successfully. Mills started with Dye Formula for black with lisle thread finish, also with colors and bleaching formulas if desired, taught by Mr. Dubois himself. Will contract for every piece of machinery required to start a fast black dye house with dye formula if desired.

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The black is inexpensive, non-poisonous, color always uniform, will not crock, fine shade blue black or jet black produced as desired without extra cost.
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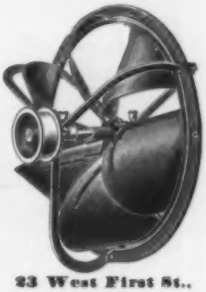

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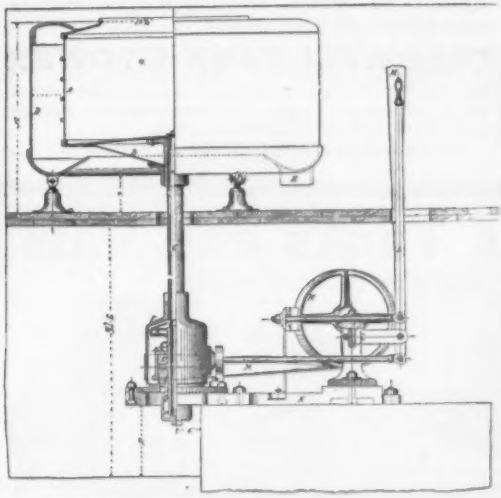

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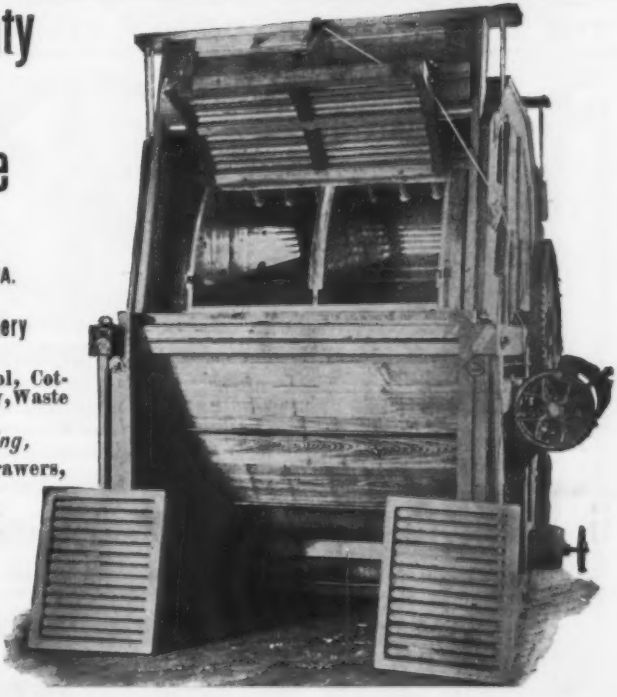

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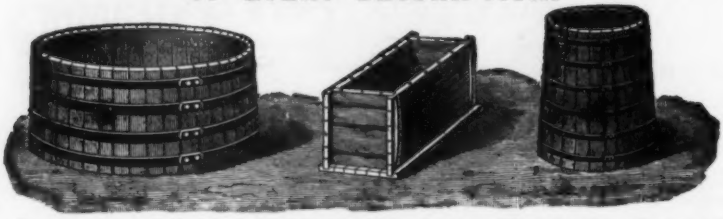

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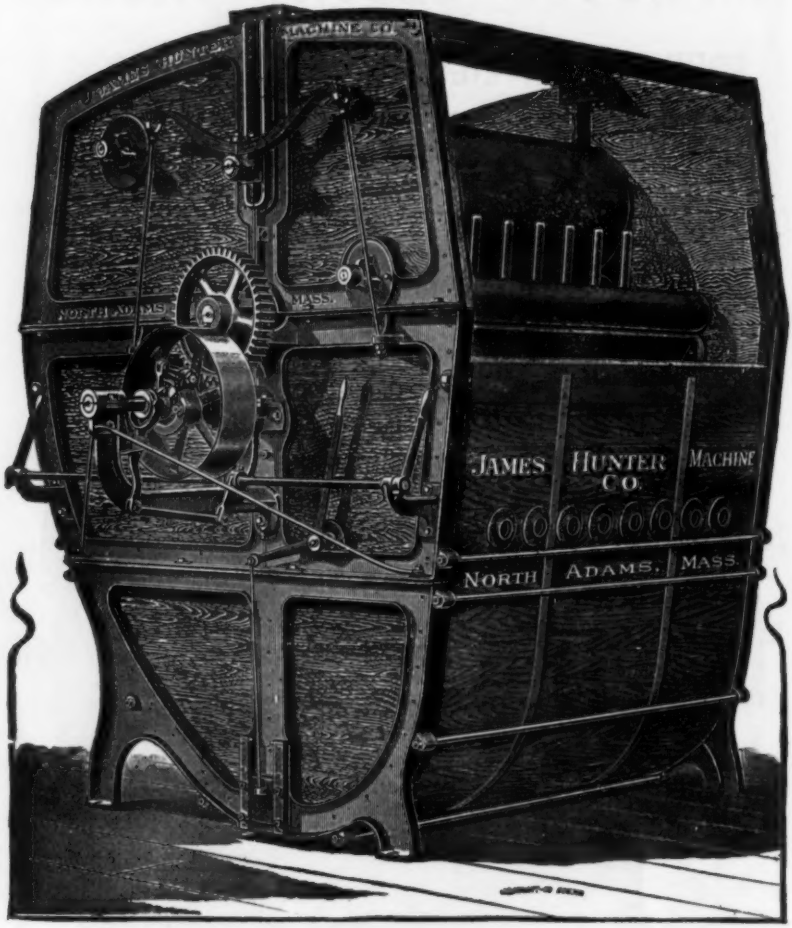


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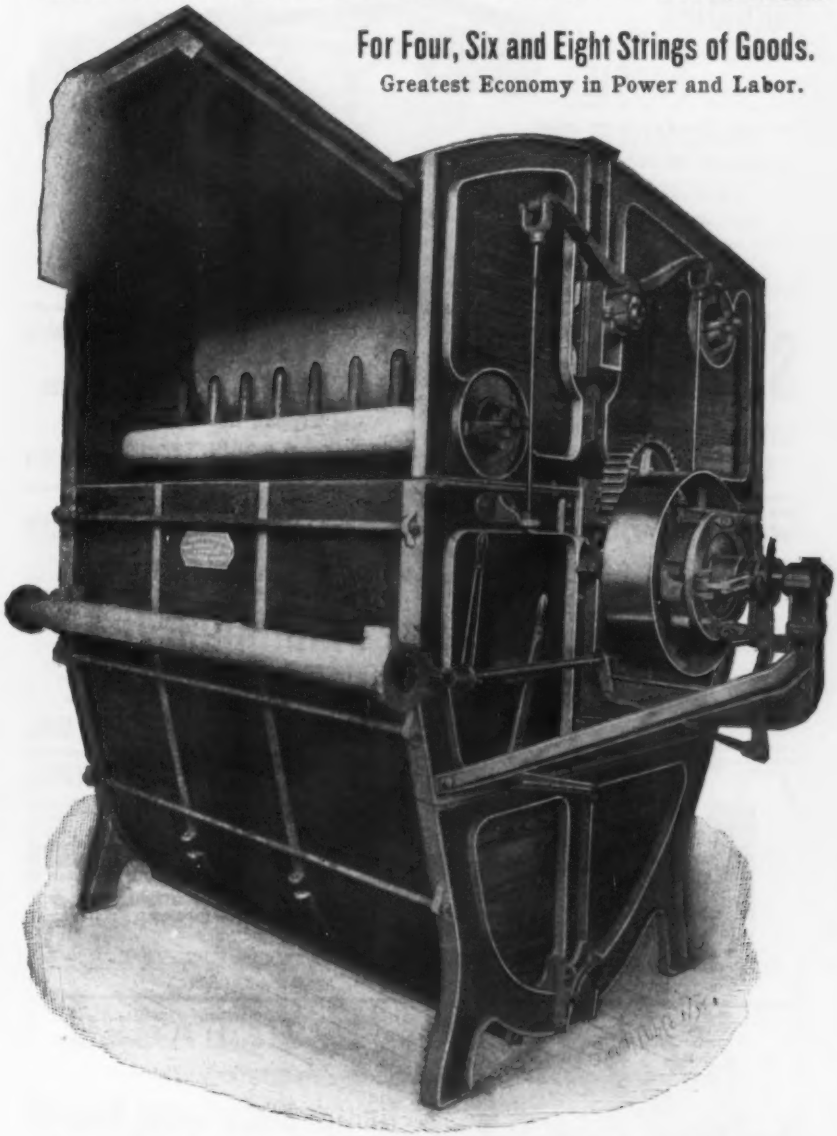

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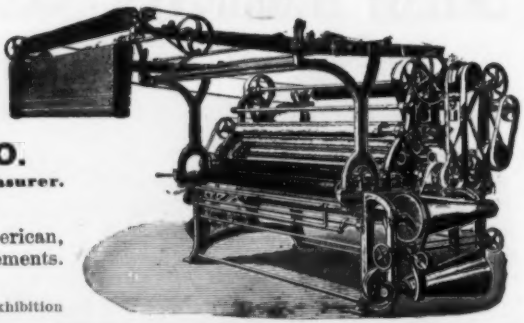

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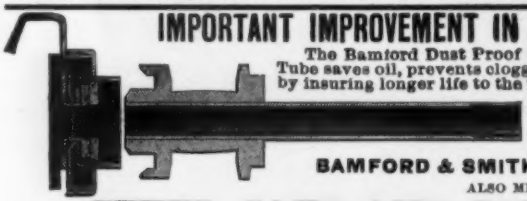

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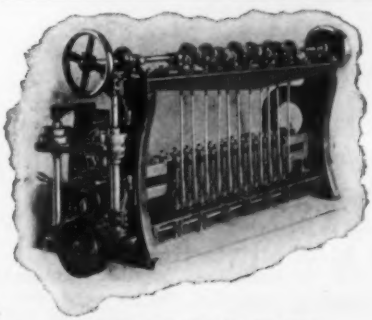

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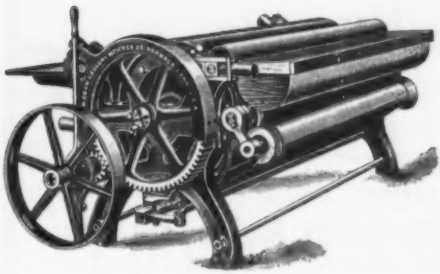

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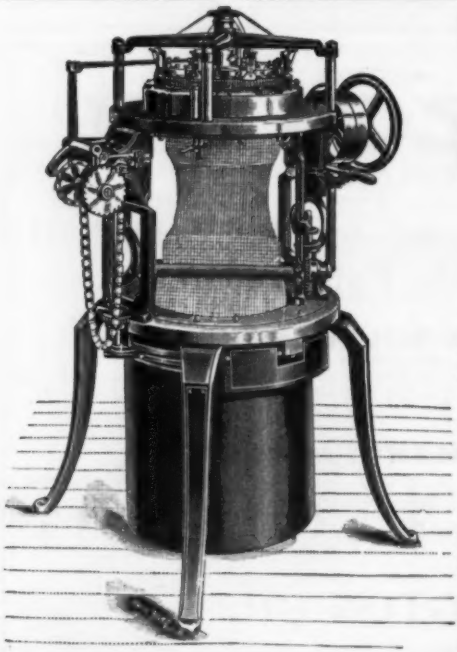

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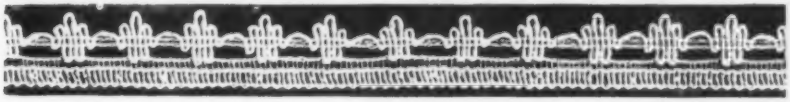

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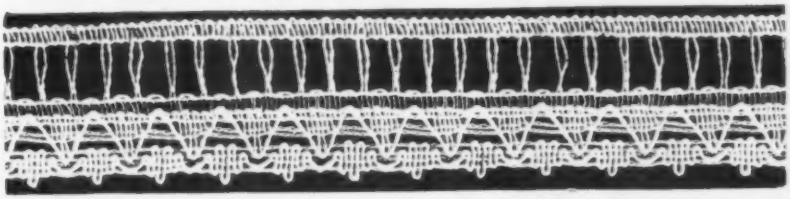

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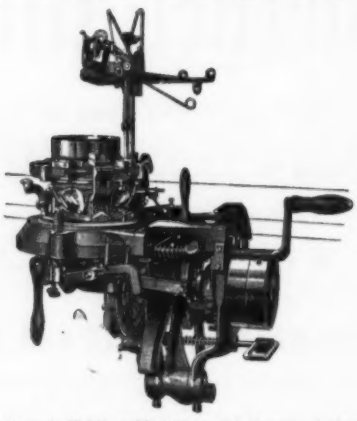

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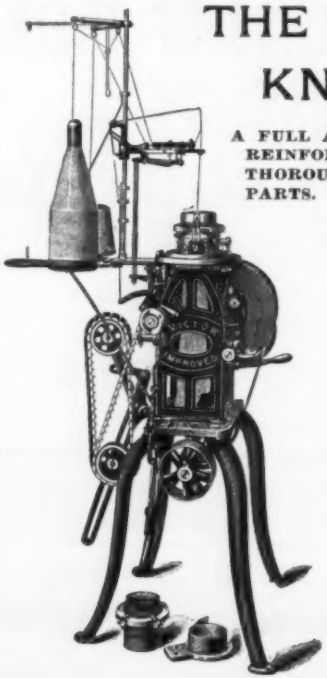

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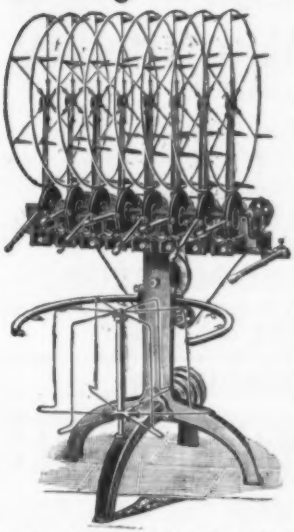

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Everything pertaining to the manufacture of all classes of Knit Goods, for example: Machines for Ribbed and Flat Underwear, Hosiery, Sweaters, Jackets, Mittens, Gloves, Borders, Facing, and Gas Mantles, Buttonhole and Button sewing Machines, Concealed Stitch Welters and Trimmers, Union Specials, Steam Presses, Winders, Ribbers, Sleevers, Loopers, Whizzers, Stop-motions, Cylinders and Dials, Needles, Pins in bulk, Brass Stamps, Stamping Ink,—in short, write us if you are in need of anything, or if you have any Machines for sale.

**835 ARCH STREET, PHILADELPHIA, U. S. A.**

# CIRCULAR RIB KNITTING MACHINES,

Carefully designed and well made with Solid Forged Steel Cylinderr and Dials, Segmental Cam Rings, Encased Take-up, Stop Motions, etc. Standard Sizes, Reasonable Prices. Also

**KNITTING MACHINE CYLINDERS AND DIALS.**

**STAFFORD & HOLT. - Little Falls. N. Y**

EXQUISITE BRILLIANCY OF SHADE

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PERFECT UNIFORMITY OF COLOR

**FOR HOSIERY** the **DOMINO FAST BLACK** is simply the limit of scientific achievement in the production of a **DYE FORMULA** for **LISLE FINISH.** It insures brilliancy of shade, uniformity in color and cheapness of production—the real requisite for successful competitive manufacture. For **LACE HOSIERY** the **DOMINO FAST BLACK** is comparable in its results. The severest tests have demonstrated it to be, beyond a doubt, **STRICTLY SANITARY**—absolutely **NON-POISONOUS,** fast color and strong in tecture after oxidation, with an unequaled finish.

Absolutely Non-Poisonous

We are prepared to furnish the **DOMINO FAST BLACK** Formula, or we will install complete Dye Plants for the process, with all or any part of the machinery for **BLACK** or **COLORS,** and under the superintendence of the most practical and successful dyers in the country.

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**PHILADELPHIA**

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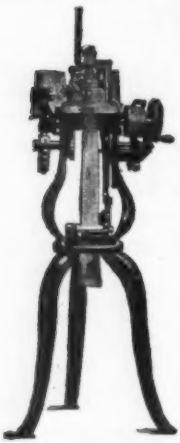


# Pepper Manufacturing Co.

LAKEPORT, N. H.,

MANUFACTURERS OF

## KNITTING MACHINERY,

INCLUDING

**Pepper's Flat-Ribbed Cuff Machines,**

Automatic Welt and Loose Course Machines for Sock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Shirt Cuffs, Sock Tops, Hose Legs, Wristers, etc.

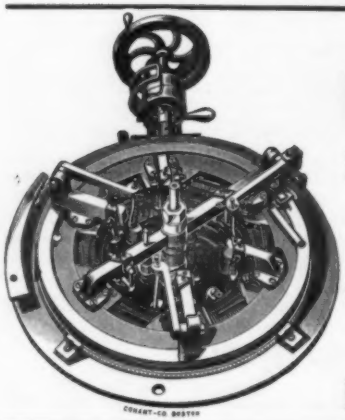
**GOLF AND BICYCLE STOCKING MACHINES.**

ALL KINDS OF

**CIRCULAR RIBBED MACHINES,**

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins.

**CORRESPONDENCE SOLICITED.**



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# KNITTING MACHINES

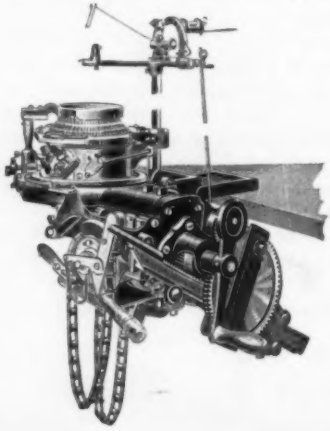
Either plain or full automatic, with stop motion complete, for

**RIBBED UNDERWEAR**
**SWEATERS,**
**CARDIGANS,**
**CUFFS and ANKLETS.**

The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

**Leighton Machine Co., Manchester, N. H.**

# Excelsior Knitting Machine Manufacturing Co.



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## 7-8 AUTOMATIC KNITTERS,

Adapted for Ladies' Plain Hose, Men's Half Hose or footing Ribbed Hose.

**Its Production is Greater than any 7-8 or full Automatic Machine now on the market.**

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BUILDERS OF

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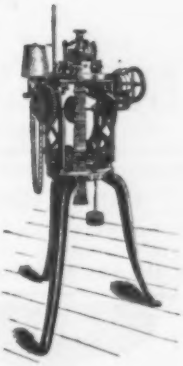

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GAS ENGINES for city or country.
BRUSHING MACHINERY
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EFFICIENT
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LOW IN PRICE.

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*Blocks for Printing Hosiery.*

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## THE INVINCIBLE, "C,"

### FULL AUTOMATIC KNITTING MACHINE

**For SEAMLESS Hosiery**

A BIG PRODUCER.

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PRACTICAL AND ECONOMICAL IN OPERATION.

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NO EXPERIENCE REQUIRED TO TRANSFER RIBBED TOPS BY THE INVINCIBLE METHOD.

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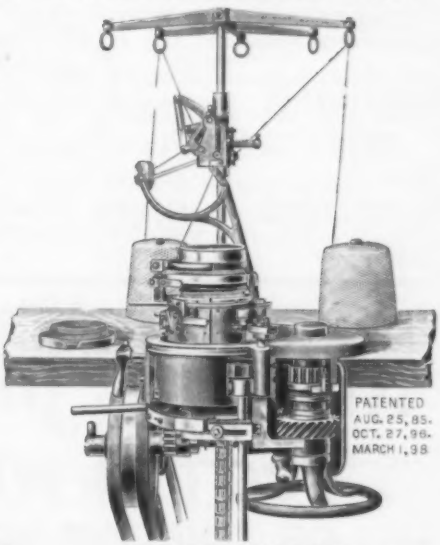
A MACHINE OF THE HIGHEST GRADE.

Write for Catalogue.



PATENTED
AUG. 25, 85.
OCT. 27, 96.
MARCH 1, 98.

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# 3-4 Automatic Knitter

FOR ALL KINDS AND GAUGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and better goods. Costs less for repairs. Gives less trouble to fixers Range on Half Hose, from the coarsest to 220 needle.

**Exclusive rights to Brown's ATTACHMENTS FOR LACE EFFECT.**

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Cylinders and Dials for all size machines.

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BOARDS FOR FAST BLACK DYERS.

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BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

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## "OVERLOCK" MACHINE

(TRADE MARK.) (Pat. Apr. 5, 1892.)

Patent twice sustained by U. S. Circuit Court of Appeals.

*MAKES OVER 3000 STITCHES PER MINUTE.*

TRADE MARK.

For SEAMING, HEMMING AND OVEREDGING Flat, Ribbed and Fancy Underwear and Hosiery. And for OVEREDGING Lace Curtains, Ribbons, Belts, Hat Bands, Flannels, Blankets and other Fabrics.

IT MAKES

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And in each case with one operation only, including trimming and covering of raw edges.

4. The "OVERLOCK" TAILOR-MADE SEAM. (By means of the Feller.)

Business established in 1859.

THE ELASTICITY OF ITS STITCH EQUALS THE FULL STRETCH OF THE GOODS.

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# Knitting Machinery

## SCOTT & WILLIAMS,

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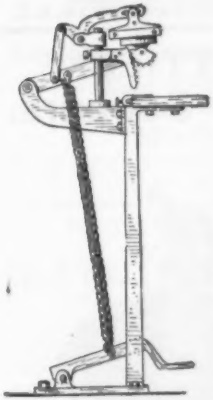
# A NEW NECK MARKER!



THIS MACHINE will please the Underwear manufacturers. It is simple—a child can run it, it is so nicely balanced. The Stamping Die is self inking, and makes a clean, clear mark on thick or thin goods. When the ink pad is removed the Die makes a crease. It only weighs 100 lbs. Can be set up anywhere, and can be run as fast as any power machine.

**PRICES REASONABLE.**

OUR VERTICAL DRYERS are steadily gaining ground, especially with mills that at once have them in operation for a sample. Progressive mills will in dull times improve their machinery so as to be ready when trade starts up. Those mills are the ones that are adopting the Johnson Patent Vertical Dryers, owned and manufactured by

**E. M. ANTISDEL .·. Utica, N. Y.**

Send for circulars and cuts of both machines and price lists.

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LEADER OF KNITTERS

**ORIGINAL and BEST**
**PARTS INTERCHANGABLE**
**EASILY and QUICKLY OBTAINED**

Hosiery and Sweater
Cardigan Jacket
Automatic Racked Border
Full Fashioned Union Suit

**MACHINES**

**LAMB KNITTING MACHINE CO.,**
*CHICOPEE FALLS, - - MASS.*

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THE

# Merrow High Speed Crochet

## and Scallop or Shell Machines,

For finishing the edges of Knit Goods, Bed Blankets, Horse Blankets, or other fabrics.

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## THE MERROW MACHINE CO.,

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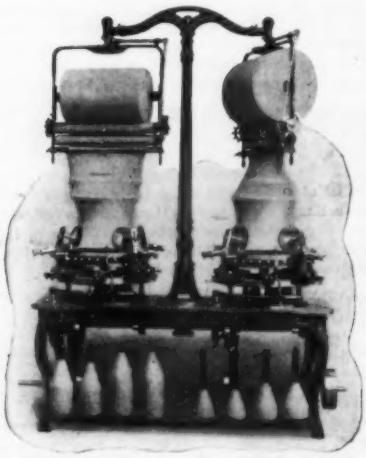

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Knitters, Winders, Burrs, Attachments.

**BEATTIES' Patent Loopers.**

**Wm. Beattie & Son,**
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An Illustrated Catalogue will be sent on application.

**CIRCULAR AUTOMATIC RIB KNITTING MACHINERY** FOR

Combination Suits,
Sweaters,
Richelieu Ribs,
Cuffs,
Ribbed Shirts,
Shaped Swiss Ribs,
Rib Tails, etc.

Over 1000 machines now in operation.
Just now we are making a speciality of 1½ and 16 feed machines for stripes.

The HOMER P. SNYDER MFG. CO.,
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We make the best in
QUALITY
COLORING
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**HOSIERY BANDS AND LABELS**

We carry all the "Specials."

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LAKEPORT, N.H.
Spring Needle Circular Knitting Machine
For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.
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**Celebrated Brand** PYRAMID TRADE MARK **Lacings**
For Underwear, Overshirts and Sweaters,
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Manufacturers of
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of all kinds. Warranted in every respect.
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The best hosiery needle in the market.
Manufactured by
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All work guaranteed.

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And Burr Blades of all kinds.
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**Standard Knitting Machine Needles,**
And all kinds of Sewing Machine Needles.
Parts for Wilcox & Gibbs Mfg., and all Sewing Machines
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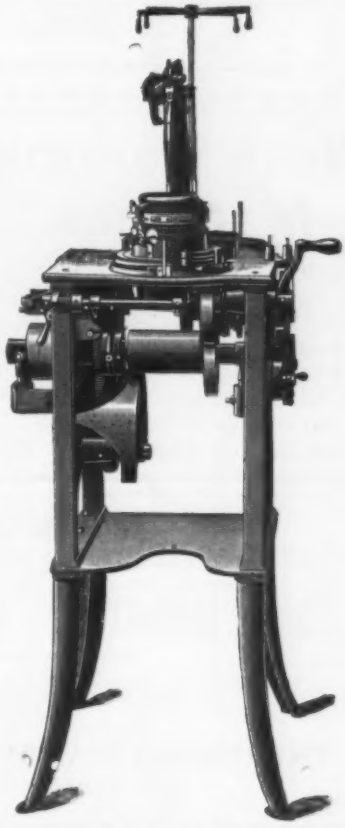
**ACME**
**Automatic Knitter,**
FOR SEAMLESS HOSIERY.
All Kinds and Gauges.



Best method of transferring ribbed legs and tops.

Greatest production of perfect work at least expense.

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# BRAIDING MACHINERY,

All Styles and Kinds for Flat and Round Braids.

**SOLID SASH AND CURTAIN CORDS.**

Shoe and Corset Laces, Banding and all

**BRAIDED FABRICS.**

# Neck Marking Machines.

The Power Neck Marking Machines made by Thos. Kennedy, Cohoes, N. Y., are the original machines for this purpose and are thoroughly covered by Patents.

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Our New Improved Light-Running Short Carriage

**KNITTING MACHINE**

is unsurpassed for full-fashioned Sweaters, Jackets, Leggins, regular Knit Underwear, Union Suits, and all other *regular* and *selvage* Knit Garments. Made with 2 complete yarn carriers and 2 color striping attachment and has the new combined Sweater Stitch Drop Lock and Tubular Lock. Special Glove Machines. Finger Knitting Machines 3 inches width of needle bed. Rapid 2-thread Lock stitch Overseamers.

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**NO ROYALTY!**

The Industrial Mfg. Co., presents for **OUTRIGHT SALE**

# The "Industrial" Overseaming Machine

which accomplishes with perfection.

(1) The "Industrial" overedge.
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**THE INDUSTRIAL MFG. CO., Camden, N J.**

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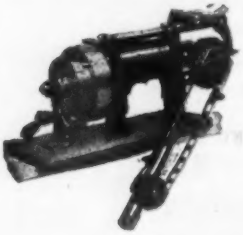

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Write for particulars about my new

**AUTOMATIC FOLDING and CUTTING MACHINE.**

Cheapest and best in the market.

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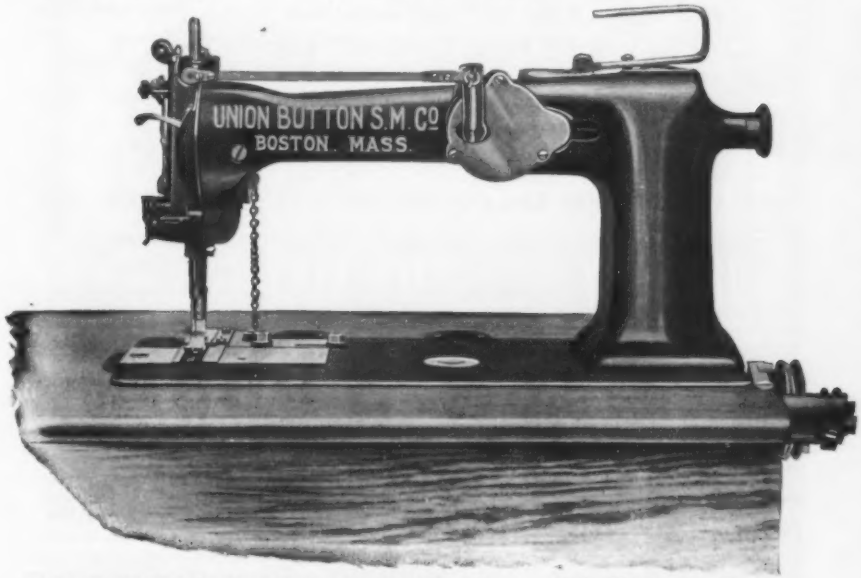
# Our New Drawer Strapping Machine

**SHOWN BELOW**, will sew on straps of any width and thickness, makes either wide or narrow stitching across the straps and will also **BAR** each end of the stitching.

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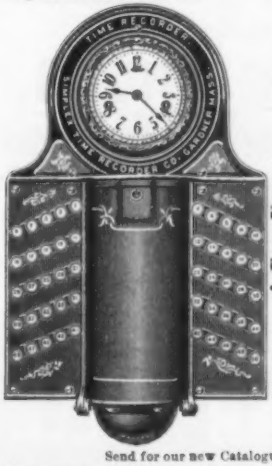
**Three Sizes for 30, 50 and 100 People**

**2 Styles—Regular, allowing as many to register as can reach the machine. Interlocking, allowing but one to register at a time.**

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# Approved by The National Board of Fire Underwriters.

Up-to-date Mill owners reduce the cost of production by installing new and improved machinery.

Artificial Light either means a heavy loss of power in running large dynamos, or big gas bills.

One of **WING'S ACETYLINE GAS GENERATORS** will supply your gassing machinery for cloth and yarn singeing, and turn artificial sun light into your mill at a minimum cost.

Send for our pamphlet on Acetyline Gas for Mills and Factories.

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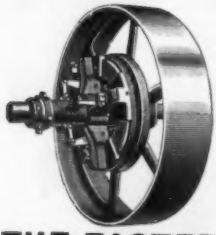

Have been a standard of comparison for years. They are very simple, very strong, very powerful and honestly constructed, Adapted for use on all kinds of machinery that have had a wide application. Perhaps they are just the thing you have been looking for.

**Ask for Complete Information.**

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For Heads of **3** Feet and Upwards.

**UPRIGHT AND HORIZONTAL.**

ADAPTED TO ANY AND ALL SITUATIONS.

**SPECIAL FEATURES:**

**High Speed,** combined with **efficiency. Balanced Gate,** easily regulated by Governor. **Close regulation** and **steady motion.** Concentration of **great power in limited space,** requiring small penstock room. **Great strength,** and with a number of patented features. Special attention given to desiguing for difficult situations.

Write for pamphlet stating your Head and Power required.

**JAMES LEFFEL & CO., Springfield, O., U.S.A.**

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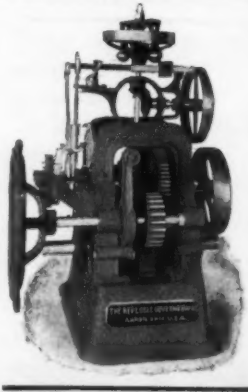

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## TEXTILE MILLS,

ELECTRIC LIGHT, POWER & RAILROAD WORK.

**Correspondence Solicited.**

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Alcott's High Duty

TURBINE WATER WHEEL

MOUNT HOLLY, NEW JERSEY.

## The "A B C" Ventilating Fans

Ventilating Fans—good ones—are a hobby of ours. Our Fans deliver one-third to one-half more air with the same power as others. They are strong, handsome and durable. Isn't it it about time you were writing us about them?

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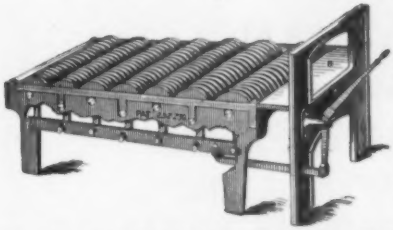
L. L. CLINE Adv. Co.

## CLEAN FIRES ARE THE BASIS OF ALL FUEL ECONOMY.



OUR GRATE will positively increase your Steam Supply by giving uniform clean fires and even steam pressure, without laborious cleaning or poking. They will pay their cost in a short time. We know it. We make all styles for different boilers.

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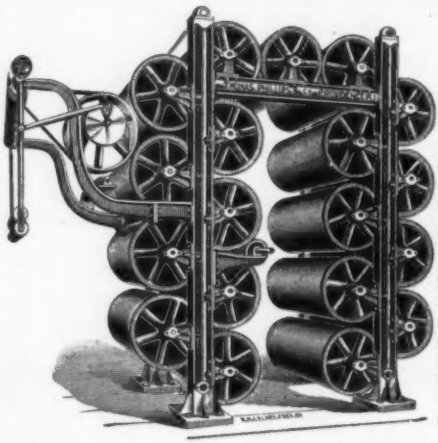
**MODERATE PRICED**

# Gear Cutting Machine

Especially adapted for use in Repair Shops. Now in use in **Three Hundred** representative mills, including **Twenty-four** in Fall River, Mass. On application, we shall be glad to submit full particulars, prices, and photographs of the latest improvements. Send for our **1900 Pamphlet**.

**THE D. E. WHITON MACHINE CO.,**
**19 Oak Street, New London, Conn.**

# Drying and Finishing Machinery.



**Phillips Upright Drying Machine.**

The cut shows a 19-can machine with two tiers with intermediate can for continuous drying. We build any arrangement of stringing and furnish any desired number of cans, of any length, either with Phillips Steel Head or Cast Iron. We strongly advise our Steel Head Can. It is a big improvement as eight years' experience has demonstrated. This upright machine enables cloth to run without wide intermediate spaces between the tiers, as in horizontal machine, thus avoiding "scrimps." We also build Horizontal Frames, but on radically different principles from most others. Our illustrated catalogue explains all these points at length and has many plates showing different styles of stringing. It may be had for the asking.

## THE THOMAS PHILLIPS CO.,

PROVIDENCE, R. I.

# WANTED—A MAN

as Our Sole Agent in your city or county.

An honest, capable, energetic man, who thinks well of himself, and one who is thought well of by you.
We have a full line of Specialties for Factory use.

**THIS IS THE LEADER**

**WHICH ALL ADOPT WHO TRY.**

Show this advertisement to the RIGHT man; thereby do him, us, and possibly yourself a good turn.

**STEPHENSON MFG. CO.,**
**ALBANY, N. Y., U. S. A.**

*Wouldn't you like a Free Sample of this Dressing for your own test?*

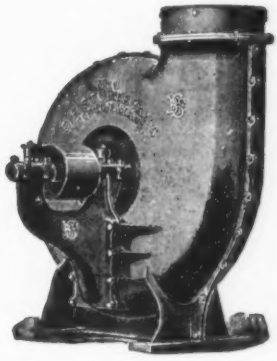
# Reduce the Expense

of conveying

## Cotton and Wool

by using the

## Sturtevant Blower System.



Cleans the Stock in the Opening Process. Reduces time of drying by one-half as result of handling from picker or dyehouse to dry-room, and leaves it in better condition for carding.

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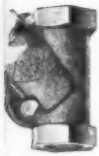

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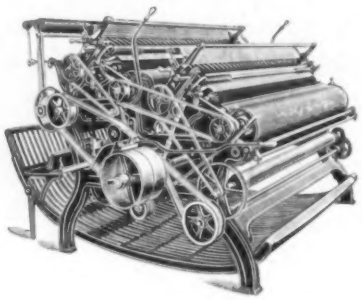

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